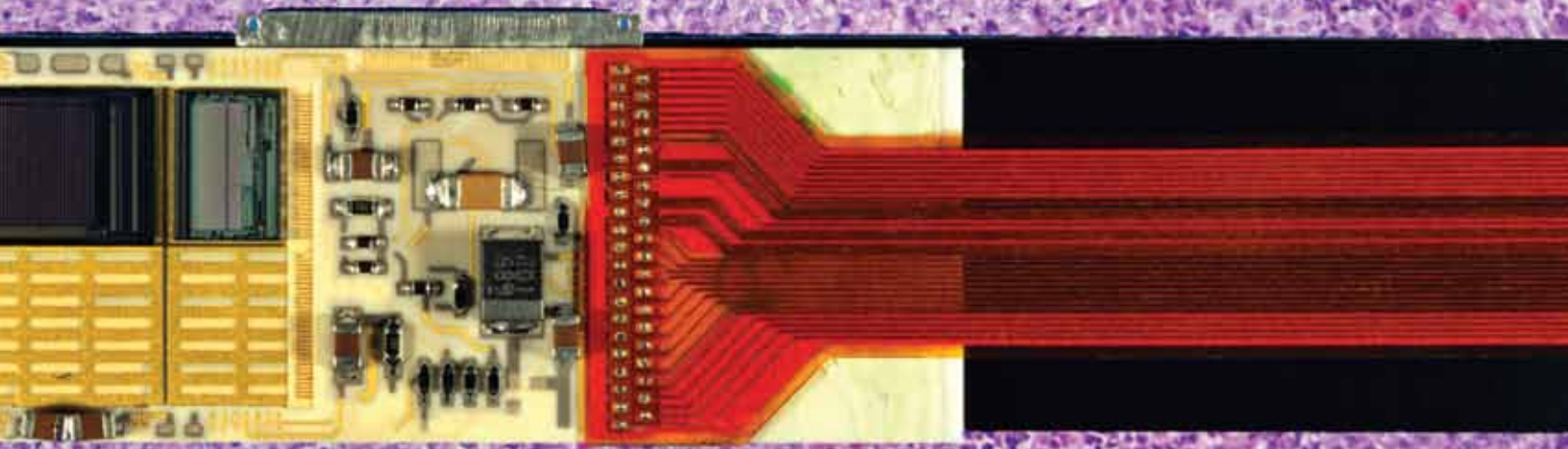
NEADS

National Educational Association of Disabled Students
Association nationale des étudiant(e)s handicapé(e)s au niveau postsecondaire

Success in STEM:

Studying and Pursuing a Science or Technology Career as a Post-Secondary Student with a Disability



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National Educational Association of Disabled Students (NEADS)
4th Level Unicentre,
Carleton University,
Ottawa, ON K1S 5B6
Canada

Tel: (613) 380-8065
Toll-Free: 1-877-670-1256
Fax: (613) 369-4391
E-mail: info@neads.ca
Website: www.neads.ca

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Dear Reader:

Often in Canada, we take for granted the "right" to access an education, or the "right" to go into certain careers of our choosing. We recognize that this condition does not exist in many places in the world – something that Canada's signing of the UN Convention on the Rights of the Disabled Person, and indeed, the existence of that Convention itself, is designed to counter over time – but we often fail to recognize that the same situation can take place here, in our home country.

Students with disabilities are under-represented within education and employment. Our research has indicated that the disabled student is often likely to gravitate toward social science disciplines, particularly those (such as education, counselling psychology, social work and law) whose practitioners they encounter at a young age. That's not all, though – students with disabilities who may have aspirations to go into Science, Technology, Engineering and Mathematics (STEM) disciplines in post-secondary education often won't. Ask these students why, and you get a number of reasons:

"I was told it wasn't possible, that a disabled person couldn't do science."

"It was too expensive."

"Nobody knew how to get the accommodations I needed."

"Nobody told me I could – I didn't have any mentors."

"I was in science; nobody wanted to hire a disabled person to do that."

"I was discouraged in high school."

Choosing not to go into STEM fields is one thing; being turned away from STEM fields is something else entirely – and doesn't track with our national principle of the right to equal access and opportunity for all.

For this reason, we launched the "Enhancing Opportunities for Students and Employees with Disabilities in Science and Technology-Related Fields" project, with funding from the Imperial Oil Foundation, in April of 2008. In our initial phase of this project, we conducted a series of environmental scans and interviews in order to determine what the barriers faced by students with disabilities in (or considering) STEM fields were and what progress has been made in Canada and elsewhere. In the second phase of the project, we developed the resource guide you now are reading in order to remove some of these barriers, by helping to address the issues raised above.

The guide features descriptions of some of the most common barriers faced by students and employees with disabilities in STEM fields, and a series of resources that we hope will be useful in overcoming these systemic challenges. You will also find profiles of disabled individuals who have successfully obtained degrees and careers in STEM-related fields. We hope their stories will inspire, and will serve as examples that aspirations for success in these challenging fields can be realized.

There is material in this guide for students, service providers and caregivers to apply, and there is also material available for educators and employers. Indeed, we are very happy to work with anyone interested in making sure that this information reaches and becomes useful for all groups who will benefit from it.

This material can also be found on our website (www.neads.ca). We hope that our research will lead to increased attention paid to the interface between disabled people and the STEM fields.

This work would not have been possible without the immensely talented team of researchers and Board members that constituted the Project Team. Our sincere thanks go to Jennison Asuncion, Melissa Bolton, Wade Brown, Jessica Cowan-Dewar, Tim McIsaac and Dr. Mahadeo Sukhai for their invaluable contributions to this guide. This guide was written by Melissa Bolton, Wade Brown and Jessica Cowan-Dewar, with contributions from a number of other writers who are cited in the publication. The guide was edited by Neil Faba, Frank Smith, Jennison Asuncion and Dr. Mahadeo Sukhai.

Thank you for reading this guide.

Sincerely,

The Board of Directors
National Educational Association of Disabled Students (NEADS)
March, 2010

NEADS

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An Introduction to the Guide

The National Educational Association of Disabled Students (NEADS) is an organization focused on the support, empowerment and advocacy of post-secondary students with disabilities. The organization provides resources and assistance through multiple ventures, including relevant research, services, and scholarships to students with disabilities. NEADS supports disabled students in their educational pursuits, and advocates for their rights. The organization provides a national forum to facilitate communication and a network for students with disabilities across Canada to discuss their concerns, barriers and experiences as they navigate through their post-secondary programs.

Within the context of Canadian post-secondary research, students with disabilities are largely underrepresented in major studies. NEADS recognizes this problem, and is presently engaged in a number of projects and proposals to raise awareness around crucial issues and concerns pertaining to students with disabilities. This research is accessible to students through presentations, publications and the overall dissemination of the research outcomes in the NEADS network of schools and organizations. These ventures are sparking changes from the micro (student advocacy) to the macro (policy changes).

Over the past two years, with funding from the Imperial Oil Foundation, NEADS has spearheaded a significant research undertaking with the aim of enhancing opportunities for post-secondary students and graduates with disabilities in science and technology related fields. Previous research illustrates that there is an under-representation of people with disabilities in science, technology, engineering and mathematics fields (Burgstahler, 1994; Burgstahler, 1995; Blumekopf et al., 1996; Alston & Hampton, 2000; Stern, 2002). Specifically, these fields include: maths, chemistry, physics, environmental sciences, geology, information technology, and engineering. This guidebook has been aimed at understanding the barriers faced by students wishing to enter into these fields, the accessibility of such programs, and the availability of related resources and supports for students with disabilities within these fields.

The 'Enhancing Opportunities for Post-Secondary Students and Graduates with Disabilities in Science and Technology-Related Fields' project — and the research that led to the development of this guide — was multifaceted, in that it consisted of a literature review, environmental scan, and key informant interviews. The environmental scan for this project included contacting relevant organizations and disability service providers; then identifying and contacting key stakeholders, and conducting appropriate consultations. Additionally, key informant interviews were conducted with students with disabilities in science and technology fields of study, recent graduates from these programs, disability service providers, teachers/professors, and employers.

This study provided insight into the opportunities, accessibility, resources, and difficulties that many students with disabilities encounter in the science and technology fields. The guide you are reading illustrates the evidence uncovered and the lessons learned in our research. It provides a framework for the different opportunities and resources that are available within Canada. It also presents the pertinent issues in the context of a number of important subjects: advocacy, rights, disclosure concerns, workplace and school accessibility. It presents stories of personal triumph from students' recollections as they navigated through their education and sought challenging career opportunities. It is our hope that the guide will be used as a tool by students who are interested in science and technology fields of study and careers but who have questions along the way, as well as by educators of such students and employers who may be curious or concerned about the prospect of hiring people with disabilities.

How to Use This Guide

The guide is intended primarily for students with disabilities, although it also includes some material aimed at educators and employers.

The guide is divided into easy-to-access sections. It is not necessary to read the whole guide all at once. Instead, you may read individual sections as they apply to you. The material is available online at www.neads.ca and in the electronic (CD) versions of the guide and is divided so that each section is separately accessible from the table of contents. If your interest is in the stories of those people with disabilities who have succeeded in science and technology-related fields, for example, we refer you to the profiles throughout the guide. If, on the other hand, you seek advice on dispelling common myths in the workplace about persons with disabilities in science and technology-related fields, you may go directly to the appropriate section on workplace rights.

We invite you also to explore the links online at our website that direct you to the extensive set of resources researched for the guide.

Results of the Project Research Phase

Background

This manual is built upon the research findings revealed through the National Educational Association of Disabled Students' (NEADS) two-part study on "Enhancing Opportunities for Post-Secondary Students and Graduates with Disabilities in Science and Technology Related Fields" – funded by the Imperial Oil Foundation and conducted by lead research consultant Jessica Cowan-Dewar. The first phase of the project consisted of a literature review and environmental scan to gather information and identify key themes, which were then used to develop a topic guide for a series of key informant interviews. The next phase consisted of interviews with students, graduates, and employees with disabilities; employers, academics service providers, and career counsellors within the science and technology sectors in Canada.

Methodology

A review was conducted of both the peer-reviewed literature and the grey literature related to the representation of persons with disabilities in the sciences and technology-related fields. Using a number of education, science, and technology databases, the peer-reviewed literature was searched and articles relevant to this project were identified. In addition, reference lists were cross-checked to ensure inclusion of the optimal number of relevant papers. Furthermore, a search of the grey literature was conducted primarily through the search engines Google and Google Scholar; in some cases, unpublished but relevant papers were found on key websites such as that of the American Chemical Society (www.acs.org). The literature review and environmental scan were concerned with the following fields of science: mathematics, chemistries, physics, environmental sciences, geology, information (and other) technologies and engineering. Literature from both the health sciences and biological sciences was excluded, because these fields were beyond the scope of this initiative.

The environmental scan methodology was multi-pronged and included internet searches using Google, following up on suggestions from the Science and Technology Project Advisory Committee of NEADS, contacting relevant organizations and corporations, sending out an email to Canadian college and university disability service providers, posting several requests for information on electronic discussion forums including NEADS-L (the association's electronic discussion forum), identifying and contacting key stakeholders, and in one instance, a face-to-face meeting.

The environmental scan led to the identification of a number of potential key informants for the interview phase of this project. Careful attention was given to selecting key informants from across Canada. Of the twenty-seven key informant interviews conducted primarily over the telephone between October 2008 and January 2009, two of the informants were scientists with disabilities working in academia, one was a high school teacher, five were disability service providers, seven were students, ten were employees or employers, and two were unemployed due to disability. In a few circumstances key informants responded to the interview questions by email. The interviews were analyzed, and key themes and trends were identified. Interim findings from the literature review, environmental scan and key informant interviews were presented at the 2008 NEADS national conference "Learning Today, Leading Tomorrow" in Ottawa in November, in a workshop entitled "Enhancing Opportunities in Science and Technology Related Fields."

Results & Findings: Literature Review and Environmental Scan

Not surprisingly, the literature and program information indicate that there is an under-representation of people with disabilities in the science, technology, engineering and mathematics fields (Burgstahler, 1994; Burgstahler, 1995; Blumekopf et al., 1996; Alston & Hampton, 2000; Stern, 2002). The key findings and results offer further insight into this under-representation. In addition, a number of themes emerged from the literature review and the environmental scan.

Key Themes

Canada vs. United States

Locating peer reviewed literature relevant to this project from Canadian sources proved difficult. There is unquestionably a larger body of U.S.-funded and U.S.-focused research and literature relating to the representation of persons with disabilities in the science and technology fields. This may be explained by the fact that in the U.S., the National Science Foundation and relevant government agencies have made disability an area of focus. There is also a dramatic contrast between the number of American vs. Canadian organizations and corporations that have well-developed programs, mandates or strategies involving persons with disabilities in terms of recruitment, retention and training.

In the United States, examples of programs include:

- ACCESS, a 10-week summer program at NASA/Dryden Flight Research Centre for undergraduate and graduate students with disabilities majoring in engineering, science, mathematics, or computer science;
- Workforce Recruitment Program, a workforce recruitment resource dedicated to identifying job candidates with disabilities; and
- Microsoft, which for almost 10 years has been targeting youth with disabilities to encourage and support them in pursuing technical careers.

The discrepancy between the number of relevant U.S. vs. Canadian programs can be explained, at least in part, by more progressive U.S. disability-related legislation. Virginia Stern (Director of the Project on Science, Technology & Disability in the Directorate for Education & Human Resources Programs, AAAS) explains that both assistive technology and civil rights legislation have provided "enormous advantages toward getting an education" (as quoted by Wilkinson, 2001). In particular, the passage of the wide-ranging Americans with Disabilities Act (ADA) of 1990 has had a significant impact on the lives of people with disabilities. According to The Center for an Accessible Society "… the ADA has profoundly changed how society views and accommodates its citizens with disabilities." (www.accessiblesociety.org/topics/ada). In contrast, Canada has no unified act which promotes or mandates the integration of people with disabilities into mainstream society. Ontario has an act which is analogous to the ADA, but no other province does. All other relevant Canadian legislation states that people cannot be discriminated against in education or employment for having a disability, but makes no mention of how to accomplish this objective.

Attitudinal Barriers

A review of the literature demonstrates that attitudinal barriers have been and continue to be central to the struggle of persons with disabilities in science and technology fields. According to the organization Chemists with Disabilities (CWD) the primary barrier to the participation of

people in fields requiring chemistry is attitudinal. Thus, the organization's mandate is to "inform chemistry educators and employers of scientific and technical personnel about the capabilities and contributions of chemical professionals who happen to have physical, sensory, or learning disabilities" (https://communities.acs.org/groups/chemists-with-disabilities-we-all-can). One U.S. initiative, NFB-Youth Slam, chooses to confront attitudinal barriers head-on by facilitating a four-day academy for over 200 blind and low vision students from across America. The purpose of this initiative is "to engage and inspire the next generation of blind youth to consider careers falsely believed to be impossible for the blind."

Internship Opportunities

A key theme that arose repeatedly from this research is that of the importance and value attributed to internship opportunities and cooperative education (Burgstahler, 1995; Stern, 2002). Internships for persons with disabilities are not a new concept. As far back as 1995, the Kennedy Space Centre in the United States became involved with the High School High Tech (HSHT) program in order to provide internships for high school students with disabilities (Luecking, 2004). The goals of the HSHT program are to "motivate students' interests in high-tech careers and to assist students with disabilities to become independent, productive members of the workforce of the 21st century."

Particularly strong internship programs include:

- NASA: Goddard Space Flight Centre's Program for Individuals with Disabilities, which has two internship streams – one for high school students and one for undergraduate college students with disabilities;
- NASA: Dryden Flight Research Centre's Cooperative Education Program, ACCESS (Achieving Competency in Careers in Engineering and Space Science), is a 10-week summer work program for both undergraduate and graduate students with disabilities majoring in engineering, science, mathematics, or computer science;
- Microsoft's Outreach Programs for Youth with Disabilities, which has been operating for almost 10 years, is committed to engaging with youth with disabilities in order to encourage them to consider future careers in technology;
- ENTRY POINT!, a collaborative program (among AAAS, industry and U.S. government agencies) which provides students with disabilities with unique internship opportunities in science, engineering, mathematics, computer science, and some fields of business. AAAS has developed links with partners as diverse as IBM, NASA, Merck, NOAA, Google, Lockheed Martin, CVS, NAVAIR, Pfizer, Infosys, and university science laboratories. Nothing equivalent exists today in Canada.

Mentoring & Teaching

An important finding and recurring theme is the role that teachers and professors play, either as facilitator or barrier to the participation of people with disabilities in science and technology sectors (Duquette, 2000; Alston, Bell & Hampton, 2002). Mentors are also central to the participation of people with disabilities in science and technology related fields, as they can break down barriers and encourage students to persevere in their chosen paths (Stern, 2002). Foster and McLeod (2004) conducted a qualitative study of deaf graduates of the Rochester Institute of Technology in New York. Their findings highlight the central role that mentors (both informal and formal) played in the lives and careers of the graduates. Family members (especially parents), teachers, supervisors

and co-workers were all cited as mentors. Mentorship took a variety of forms including instilling self-esteem and confidence, advocating, coaching, teaching and advising. Mentors provided the foundation that enabled deaf individuals to break through what are often barriers to career success despite their skills and abilities.

A U.S. initiative supported by the National Federation of the Blind (NFB) recognizes the inherent value in mentorship for the participation of people with disabilities in science and technology related fields. NFB-Link is an online mentoring program that provides resources and offers guidance on a plethora of blindness and career-related topics and is found at the following URL: www.nfblink.org/

AccessSTEM is an excellent website that provides teachers and employers with guidance on how to increase the accessibility of both education and employment opportunities in science, technology, engineering, and mathematics, to people with disabilities: www.washington.edu/doit/Stem/

In addition, Disabilities, Opportunities, Internetworking, and Technology (DO-IT), an organization based at the University of Washington, has a great website that provides materials to help make science and mathematics classes, careers, and colleges more accessible to individuals with disabilities. (see AccessSTEM website.)

Case Studies & Personal Stories

A number of non-Canadian case studies found in the literature (Reis, Neu, McGuire, 1997; Stern, 2002; Metelko, 2003) go a long way in conveying the experiences of people with disabilities in science and technology fields.

A publication entitled "Roadmaps and Rampways" (Stern, 2002), the first major publication to detail the life experiences of students with disabilities from young childhood to the early stages of their careers in the science, technology, engineering, and mathematics fields, is especially illuminating.

The life of Robert Shelton, a NASA scientist and computer software designer who was born with congenital glaucoma and lost his sight when he was 11 years old, is a noteworthy read (Metelko, 2003). These personal stories and case studies effectively communicate some of the nuances and issues often omitted from the academic and program literature.

Employers

Another recurring theme that emerged from the literature is that of employers being reluctant to hire people with disabilities (Alston, Bell & Hampton, 2002). A number of U.S. programs that actively work to counter this reluctance were identified, such as those mentioned in the "Internship Opportunities" section above.

Results of the interviews

The 27 key informants interviewed across Canada, with differing backgrounds and a variety of experiences within science and technology, offered unique and valuable insight to our project. The findings of the key informant interviews were very much in line with those of the literature review and environmental scan. In fact, the theme of attitudinal barriers as a central aspect to the level of representation of people with disabilities in science and technology was addressed by almost every person interviewed. These attitudinal barriers take a variety of forms, including ignorance, misperceptions, stigma, discrimination, and stereotyping. Ignorance and misperceptions around the science and technology-related capabilities of people with disabilities in high school (amongst

parents, teachers, guidance counselors, and the students themselves) were frequently cited. According to one respondent, "many students with disabilities don't know it is possible to go into science and technology." A second informant believes that the poor representation of people with disabilities in science and technology is related to academic advising because, "academic advisers direct people with disabilities to lower capacity jobs due to stigma and preconceived notions."

Ignorance and misperceptions were also reported in university and college (amongst professors, administrators, career counselors, peers, etc.), and in the work force. One respondent explained that he was told in high school that there were no universities for deaf people; he spent ten years of his life working in factories before he found out about three universities in the U.S. that were geared towards deaf students at that time.

According to another key informant, "too often, students avoid degree programs in science and technology at their university because they think it would be too difficult to have a good career after graduating."

Furthermore, it appears that many employers have strong misperceptions about the limitations of employees with disabilities and the impact of these limitations upon their work. Other attitudinal barriers such as stereotypes also come into play. A number of respondents suggested that certain careers and programs of study may seem more "appropriate" for people with disabilities. Examples of "appropriate" careers included banking and communications, whereas social sciences and humanities were noted by some as more "appropriate" programs of study for students with disabilities.

In addition to external stigma, many respondents pointed out that internalized stigma acts as an important barrier to representation of people with disabilities in science and technology. Two informants recounted particularly dramatic experiences of stigma and discrimination. The first was an undergraduate engineering student who had a disability and needed to take a lighter course load as part of his accommodation. He could not obtain permission to do this. This student had many people tell him that he would never become an engineer (including an associate dean and his academic advisor). He was even told to "pack his bags and go home." He was not given appropriate accommodations, so he appealed and re-appealed. Only when he threatened to file a human rights complaint did the university begin to make accommodations. The second informant was a visually impaired individual who had applied for a job with a technology-related company. This individual made it to the third round of interviews before he was told that they had decided not to hire him because his visual impairment would be too resource intensive – it would cost the company too much money and be too time-consuming.

The dearth of visible mentors and the lack of successful role models were frequently reported as an explanation for the poor representation of people with disabilities in science and technology sectors.

The most frequently cited barriers to increased representation of people with disabilities in science and technology include:

- Lack of opportunities ("People are not going to go to school if there are no jobs when they get out");
- Lack of awareness and promotion of opportunities ("Not knowing it is possible to have a successful career in science and technology fields");
- Lack of support (from parents, teachers, guidance counselors, etc.);

- Lack of knowledge and awareness around accommodation (in high school, university and college, and in the work force);
- Lack of adequate accommodation (i.e. labs are not set up for people with mobility issues and many schools and faculties do not let students take a lighter course load – especially in first year);
- Requirements of full-time study (often not possible for students with disabilities);
- Time (takes time to travel, to access information in alternative formats, to learn to cope in the classroom, to arrange accommodations; people with disabilities often require more time);
- Resistance amongst employers toward arranging remote working situations (especially relevant to people with certain disabilities such as acquired brain injuries, mental health issues, chronic illness, etc.);
- Lack of examples/role models/mentors (e.g., professors, researchers, postdoctoral fellows, and industrial and government scientists).

A little more than half of the respondents felt that these barriers differ according to the type of disability. Several key informants mention the particular challenges that people with mobility-related disabilities may face in certain science and technology sectors. According to one respondent "a physical disability has an impact in jobs such as working in an oil refinery." A number of the key informants pointed out that some disabilities seem to be more "accepted" than others. Mental health-related disabilities, in particular, continue to be profoundly stigmatized, whereas there is lesser stigma attached to mobility-related disabilities. Furthermore, accommodations required for visible disabilities are often more obvious to employers than those required for invisible disabilities.

Discussion & Conclusions

The representation of people with disabilities in science and technology related fields is by no means a new issue. In fact, in 1975 the venerable scientific society, American Association for the Advancement of Science (AAAS) began to advocate for the admission and advancement of people with disabilities in science and engineering.

One notable exception to the dearth of Canadian programs working to improve the representation of persons with disabilities in science and technology sectors is the Toronto Rehab Scholarship in Rehabilitation-Related Research for Students with Disabilities. This $20,000 renewable scholarship is open to Masters and Doctoral students in the following rehabilitation-related fields: biomedical physics, chemical engineering, computer engineering, management of technology, mechanical engineering, physical sciences, physics, systems engineering, telecommunications, technology, medical biophysics, materials engineering, biotechnology, biochemistry, biochemical engineering, computer networks and chemistry. Other Canadian institutions should follow the lead of Toronto Rehab and undertake initiatives that actively support students with disabilities in science and technology fields while helping to raise the profile of young scientists.

For a couple of years — until 2005 — the Canadian government operated STARR (Science and Technology Abilities Recruitment and Retention), which was an innovative partnership among eight science-based departments and agencies to recruit and retain persons with disabilities into scientific and technical positions with the Federal Public Service. STARR was created to bring the representation of persons with disabilities to a fair and equitable level across departments and agencies through the active recruitment of students and new graduates. This initiative included

visible minority persons with disabilities, aboriginal persons with disabilities and women with disabilities. The program was offered through the following departments and agencies: Agriculture and Agri-FoodCanada, Canadian Space Agency, Environment Canada, Fisheries and Oceans Canada, Health Canada, National Defence, Natural Resources Canada, and National Research Council.

The purpose of STARR was to provide a number of students with disabilities enrolled in science and technology programs at universities and colleges across Canada with job training through participation in various work experience programs offered by the partnering departments and agencies. It also supported the establishment of methods to encourage career development of persons with disabilities within the partnering departments and agencies. In order to be considered to participate in the program, an applicant had to be a Canadian citizen, eligible to work for the Federal Government, self-identify as a person with a disability and be studying or have graduated in a field of science and technology, or, have relevant experience in science or technology fields. Students who were returning to full-time studies in the fall could apply through the Federal Student Work Experience Program. Graduates could apply through Post-Secondary Recruitment.

The program was said to have been developed because the Federal science and technology departments and agencies recognized people with disabilities as a "community at risk" not sufficiently represented in government jobs and that there was a substantial gap between the government's stated commitment to be more inclusive, especially in the share of positions held by persons with disabilities and the number actually employed. The Science and Technology Ability Recruitment and Retention (STARR) initiative was designed to support the government's strategies to achieve a more representative, inclusive workforce and to project the Public Service as an employer of choice, while addressing the future, specific science and technology needs of each partnering department and agency. STARR is no longer in operation and the author could not find anyone to discuss the initiative and why it was not continued.

It is encouraging, however, that the issue of people with disabilities participating in the sciences is getting greater media attention in Canada. The winter 2009 Disabilities Edition of *Jobpostings* magazine, which is distributed across the country to over 100 universities and colleges, includes a feature story on this project and the most cogent issues related to the subject. The article profiles Dr. Mahadeo Sukhai, former NEADS President (Medical Biophysics, University of Toronto), who is a Helena Lam Post-Doctoral Fellow of the University Health Network working at the Kamel-Reid Lab of the Princess Margaret Hospital/the Ontario Cancer Institute. This article, "NEADS project envisions more careers in science", cites relevant Statistics Canada data, of which there is little: "Indeed research on the number of Canadian scientists with disabilities currently employed is next to non-existent. According to the most recent Participation and Activity Limitation Survey (PALS) conducted by Statistics Canada, 96,610 people with disabilities work in Canada's professional scientific and technical services industry. But this sector includes people working in legal services, accounting, architecture and engineering, management, scientific and technical consulting and last, but not least, scientific research and development." (*Jobpostings*, winter 2009.)

A great deal can be learned from Microsoft's Outreach Programs for Youth with Disabilities approach to partnership development. Their focus on establishing partnerships with local and national organizations, as well as the U.S. government, has taken a variety of forms including "working with special education teachers to arrange job shadow and career days, to match students with appropriate opportunities, help design and market programs, events, and participate in committees, and collaborating with community organizations, to conduct disability awareness and sensitivity training for employees."

A key strategy for confronting attitudinal barriers is to increase the accessibility of the science and technology fields. The AccessSTEM website is an excellent example of a forum that is working to increase the accessibility of science and technology. This website provides elementary, high school and post-secondary teachers, as well as employers, with ideas and guidance on how to make education and employment opportunities in science, technology, engineering and mathematics accessible to people with disabilities. The website also offers users the chance to share good practices. The website includes sections on universal design, accommodation strategies, rights and responsibilities, resources, presentations, and a searchable knowledge base. This website could prove to be a useful template for an organization, such as NEADS, which may be looking to develop a similar forum for Canadian teachers and employers.

The central importance of mentorship to people with disabilities in science and technology emerged clearly from the literature review and environmental scan. This finding was strongly supported by the key informant interviews. It is a recommended priority area for NEADS to address. Any organization interested in developing a mentorship program may want to start by investigating the Canadian Merit Scholarship Foundation (CMSF). CMSF is a Toronto-based organization with a well-developed and well-honed mentorship program.

One of the best internship programs identified through the literature review is AAAS' ENTRY POINT! (detailed above). This collaborative program reasons that by expanding the pool of technical talent, industry and government will be in a better position to meet the challenges of the global economy. As a first step in this internship process, AAAS identifies and screens undergraduate and graduate students with disabilities who are pursuing degrees in science, engineering, mathematics, etc. and places them in paid summer internships. In addition to the myriad partnerships with industry, government, and academia, the strength of the ENTRY POINT! program is best illustrated by the estimate that 92% of ENTRY POINT! alumni are either working in science or engineering fields or are pursuing degrees in graduate programs. Any Canadian organization considering developing an internship program for people with disabilities may wish to refer to ENTRY POINT! as a solid example of such a program.

Next Steps

In "New Career Paths for Students with Disabilities: Opportunities in Science, Technology, Engineering, and Mathematics," the author outlines five "next steps" to increase the representation of people with disabilities in science and technology, including: "Protect and strengthen the laws that we already have; encourage businesses, educators, and health care providers to support the enabling technology that can foster independence; provide legislative incentives to encourage corporate internships and the hiring of persons with disabilities; improve research on students with disabilities and their progress in a variety of fields; and encourage communities, businesses, and schools to include persons with disabilities in local organizations." (Stern, 2002.) Each of these "next steps" deserve careful thought and further exploration by all stakeholders concerned with the representation of persons with disabilities in the science and technology sectors.

Based upon the results of the initial research, this guide will highlight the following key areas: Accommodation issues; disclosure in academia and the workforce; self advocacy and personal rights; job search strategies; mentorship and training opportunities; and personal stories of triumph and tribulation from individuals with disabilities with the science and technology fields.

NEADS Project Envisions More Careers in Science

by Ingrid Phaneuf, Jobpostings Magazine (Winter 2009, pg. 13)

Mahadeo Sukhai's interest in science was sparked when he was six, thanks to a book on astronomy, given to him by his parents. Now he's a 30-something post-doctoral cancer researcher at Princess Margaret Hospital in Toronto.

The years in between were spent hurdling the barriers that could easily have prevented the legally blind Sukhai from pursuing his dream of conducting scientific research for a living.

Given Canada's meagre employment rates for people with disabilities, it's pretty safe to assume there aren't a lot of scientists like Sukhai out there. But exactly how many there are and how they managed to overcome the barriers to their success remains a mystery. Digging deeper is just one goal of a study recently launched by the National Educational Association for Disabled Students (NEADS).

"It's something I've wanted to look into ever since I joined NEADS in 2004," says Sukhai, who was elected president of the organization in 2006.

The new two-year initiative, developed through a funding partnership with Imperial Oil Foundation, and titled "Enhancing Opportunities for Post-Secondary Students and Graduates with Disabilities in Science and Technology Related Fields," launched last April and is slated to conclude in March 2010. NEADS will receive $120,000 from the foundation for the project.

"While research has been conducted on factors affecting the inclusion of the general student population in science and technology-related programs, very little work has been done to highlight the issues and challenges faced by students and employees with disabilities within this sector," says a press release from NEADS. "Furthermore, the identification of role models or success stories in science and technology is not encouraged – every student and educator, or every employer and employee, facing these issues may well believe that they are the first, ever, to do so."

Indeed research on the number of Canadian scientists with disabilities currently employed is next to non-existent. According to the most recent Participation and Activity Limitation Survey (PALS) conducted by Statistics Canada, 96,610 people with disabilities work in Canada's professional, scientific and technical services industry. But this sector includes people working in legal services, accounting, architecture and engineering, surveying and mapping, design, advertising, management, scientific and technical consulting and last but not least, scientific research and development.

The NEADS study aims to leverage its network of college and university service providers, students and recent graduates with disabilities to obtain more useful and extensive information, with the end goal of developing a guidebook for students, employers and recent graduates.

The project also aims to research and develop a national science and technology fair for students with disabilities as an outreach tool to encourage their participation and visibility in the science and technology sector. It also seeks to establish a network of stakeholders and existing organizations to examine the research findings in the guidebook and develop strategies for communication, dissemination and implementation of strategies to counter barriers by students with disabilities in science and technology.

In short, the project aims to make Mahadeo Sukhai's success in obtaining the education and accommodations he needed to pursue his career less of an exception and more of a rule.

Opportunities Scarce

According to the project's early findings, such is not currently the case for Canadians students with disabilities who want to pursue careers in science and technology.

A first phase literature review and environmental scan of programs available to aspiring scientists with disabilities reveals Canada falls far behind the U.S. when it comes to opportunities for young scientists who are disabled, says researcher Jessica Cowan Dewar.

"I didn't find very much out there at all for Canada, but I found quite a lot of literature on programs in the U.S.," says Cowan-Dewar, citing internship programs at the National Aeronautics and Space Administration (NASA), Microsoft outreach programs and the ENTRY POINT! program, created by the American Association for the Advancement of Science. AAAS offers internship opportunities for students with disabilities in science, engineering, mathematics, computer science and some fields of business in partnership with major companies. Companies include IBM, NASA, Merck, the National Oceanic and Atmospheric Administration (NOAA), Google, Lockheed Martin, CVS (pharmaceuticals), NAVAIR (the U.S. Naval Air Systems Command), Pfizer, Infosys and university science laboratories across the U.S.

And while statistical information regarding the number of scientists with disabilities employed in Canada is scarce, Cowan-Dewar hopes to gather some useful anecdotal data in the second phase of the study, by interviewing 30 volunteers, all of them recent grads with disabilities trying to find jobs in science and technology.

Sukhai, in the meantime, has some of his own anecdotes about climbing the research ladder, every rung rendered slippery with the perceptions of colleagues and professors and the battle for accommodations that would allow him to ply his trade.

"Luckily, I didn't have a limiting attitude and neither did my family," says Sukhai. "But that attitude does exist in the scientific community. I have had some professors who just shook their heads and said they'd never seen anyone like me in a lab before. But they were flexible enough to change their minds over time."

Sukhai currently conducts his research with the aid of a lab assistant and a special microscope provided for him by alma mater, the University of Toronto.

"It took some time and there was some discussion, but we got it done," says Sukhai.

He's hoping that his experience is one that soon can be shared by more aspiring scientists with disabilities.

"I was lucky, in that I had a family and a community early on in life that did nothing to limit my expectations," says Sukhai. "But the same can't be said for everyone."

While navigating through academia and the job hunt, it is important to discuss the larger social issues that impact this process. Unfortunately, prejudice and discrimination towards individuals with disabilities continues to persist.

Prejudice can take many forms. It is often easier to recognize and label blatant and overt discrimination. Following such an experience, there is a recognizable path to counter such actions (as found in the Legal Rights section of this guide). However, subtle prejudices are trickier and more pervasive. Individuals with disabilities within science and technology related fields are often faced with situations where undertones of prejudices leak into their experience. This pervasive and subtle tone can often be couched within seemingly ambiguous situations. Some students face attitudinal barriers within laboratory settings that imply that they are incapable due to their disability. Others may wonder whether they were denied a job based upon selection criteria or prejudice. Understandably, the process of interpreting situations in terms of prejudice is unsettling, confusing and can greatly impact one's self-esteem and motivation.

Dr. Gregor Wolbring, a prominent academic, biochemist, bioethicist, health policy researcher, ability scholar and assistant professor at the University of Calgary Faculty of Medicine, offers this advice to individuals who experience discrimination:

"Never take anything personal. If people treat you badly, it's not because of you, it's because they are bad or ignorant or stupid people. They just don't get it and they will do the same to others. If someone treats you badly because they are a bully, they will also bully other people. So never take it personal. Because then you just become bitter and then you are cutting into your enjoyment of life."

While we continue to press on with changing these attitudes at a societal level, many individuals will unfortunately continue to encounter these experiences of discrimination or attitudinal barriers to access. It is important to recognize that they are not alone in this fight, and that many very successful individuals with disabilities have been faced with these injustices and have persevered to triumph within their science and technology careers. Follow your own goals and disregard the ignorance of those who tell you it cannot be done.

Academic Rights and Advocacy

Building a Case for Academic Rights

In Canada, we are fortunate to live in a country where legislation has made it possible for all people to have equal rights regardless of race, age, gender, language, place of origin, or disability. However, while these rights are available to all and enshrined in Canada's Charter of Rights and Freedoms, there is no specific legislation or guideline outlining exactly how to grant these equal rights. In the case of education accommodation, a person can't be denied the right to an education based on the fact that they have a disability, but there are no prescribed or enforced methods through which the accommodations must be made.

Here, we will look at the ways in which a person with a disability can advocate on their own behalf, so that they can exercise their right to an education.

Much of what we present here applies to taking courses at the undergraduate level, since our research indicates that it is at this stage that the loss of students with disabilities from science and technology related fields becomes most pronounced. However, we recognize that an undergraduate student in the sciences may also have co-op, internship, fieldwork and lab-based research opportunities as part of their program as well – and, indeed, graduate programs in STEM fields are, for the most part, significantly "workplace" oriented. In these cases, the materials presented in the employment-related sections of this guide are extremely relevant and applicable, and we refer the reader there for details.

Of course, the style of advocacy that is advisable depends on both the course being taken and the disability of the student in question. A student with a learning disability in a history course will require a very different set of accommodations than a person using a wheelchair would in a chemistry course.

The first step on the road to accommodation should be to identify the source of the mismatch between the needs of the student and the demands of the course. To achieve this, it would be ideal if the student and instructor could meet briefly, either after a lecture or during the instructor's office hours, so that the concerns of both parties could be explained and addressed. For example, if the instructor has never taught a student with a particular disability, or indeed any disability, they may not know what to expect from having a student with a disability in their course. It may be necessary for the student to explain the typical procedures for assignment and exam accommodations, or any other special considerations that the student typically receives for their education. Likewise, the student may have concerns about the course content or presentation requirements, which the instructor could explain in greater detail than is available in the course outline or on the course website.

If this initial meeting goes well, and the channels of communication remain open, the student with a disability should be able to complete the course as effectively as any other student in the class. In any case, it is advisable for students with disabilities who require accommodations to be successful in their studies to register with their campus Disability Services Office so that the support of that office is available should the student need it.

Unfortunately, seeking accommodation for a class doesn't always go smoothly. There may be times when either the instructor or the Disability Service Office can't or won't provide the services needed. This can be extremely frustrating for a student, but it is important that he or she remembers that

a student with a disability has a variety of options to ensure that they can successfully complete a course. If the issue is getting sufficient access to course content, in-class notes or supplemental material, making contact with other students in the class and asking them to help with course material may be the simplest solution. If a student requires more complex technical assistance, or help with course content or software, he or she may want to see if there is funding available to hire a tutor or assistant who can help outside of class time. Often, drawing on the resources of the community of students and staff can relieve minor oversights in accommodation. For this reason, the Disability Services Office on campus is there to provide support, adaptive equipment, advice on accommodations matters and other assistance.

At the NEADS 2008 conference in Ottawa, entitled "Learning Today, Leading Tomorrow," Daniel Zingaro spoke on the issue of getting technical or mathematical material prepared in accessible formats. He outlined issues surrounding getting such material converted into alternate formats, and suggested an innovative yet practical solution. Daniel, a visually impaired student, holds a B.Sc and M.Sc in computer science and is now working on his M.Ed at OISE with the University of Toronto. Daniel has worked as an assistive technologist, and has designed accessible computer games programmer through his own company (www.danZGames.com). He has authored a textbook, "Invariants: a Generative Approach to Programming," published in 2008 by College Publications. Here is an excerpt of the report of his presentation:

"Typically, there is a long wait after sending the request to the publisher to obtain the electronic format of a textbook. It is easiest and quickest for a publisher to send a PDF file. Once received, the file must be converted into an accessible format. Scientific materials are particularly hard to make accessible because of their special symbols, formulas, tables, and charts.

A screen reader can directly read a PDF file loaded into Adobe Acrobat. It can sometimes be easy to navigate through tables, but no changes can be made and it is hard to search for text. An alternative is to extract the text directly from the PDF file. Various programs can do this, including Adobe Acrobat Reader, Adobe Acrobat Professional, and Xpdf. Once the text has been extracted, a student can add notes and clean up the text.

However, sometimes these programs cannot extract the text since a PDF is an image, and the PDF font information may not be available. OCR software will give varying results. Typically, these programs produce many mistakes when converting scientific content.

Math and related material are awkward to type using a standard word processor. However, there are mark-up languages that allow authors to enter this information in a text-only format into a computer file.

LaTeX (pronounced laytex) is such a language. It is commonly used by textbook authors, readable with screen readers or other readers, and easy to learn. For example, instead of the square root symbol, the author types "sqrt," and for fractions, the author types "frac."

Authors of math and science books send LaTeX files to their publishers, and the publishers use the LaTeX source code to generate the PDF files they need. This means a version of the book probably exists in LaTeX, containing a completely accessible, text-only copy of the book's contents."

You can watch a streaming video and download PowerPoint slides of Daniel's presentation at: www.neads.ca/conference2008/en/speaker_formats_zingaro.php

A student with a disability may encounter a situation where an instructor is either so uncomfortable having a disabled student in their course, or so reluctant to allow accommodations on the grounds that it may be seen as special treatment, that proceeding with the course may become very difficult. In a situation like this, it is very important to make every attempt to contact the instructor, try to understand their concerns or misapprehensions, and for the student to do their best to try to put those issues to rest. If these attempts to obtain proper accommodation fail, it may be necessary to involve mediation so that the instructor will have to concede certain accommodations.

Mediation can take several forms. A student can first choose to have a representative from the university's Disability Services Office meet with the instructor, explain the need for accommodation, and then make a formal request on behalf of the student. If this isn't successful, the student can approach the department and faculty that the instructor belongs to, so pressure can be applied from above informally. Next, the student can approach the university Ombudsperson's Office and lodge a formal complaint, which would lead to a more formal investigation into the instructor's actions.

If all of these avenues to obtain appropriate and necessary accommodation fail, the student can then begin legal proceedings and file a human rights violation complaint. This is an extreme measure, and should not be carried out without first exhausting all other means of recourse, though it is necessary for certain situations. Links to provincial human rights commissions can be found at the end of the "Rights" section of this guide, as well as in the "Resources" section. Students with disabilities have the right to be educated to their fullest potential as any other students, and no amount of professorial concerns will mitigate that right.

One possible downside to going to greater and greater lengths to obtain accommodations from a reluctant instructor is the in-class aftermath. An instructor may end up having to give certain accommodations that they are not happy about, and as a result, their attitude towards the student who initiated the complaint, and subsequent students with disabilities, may be made more negative because of it. On the one hand, we can say that the instructor is still at fault for holding such negative stereotypes or being so unwilling to change, but ultimately, students with disabilities are advocating for the right to be educated and receive quality education. It is important to pick your battles, and remember that if an instructor is reluctant to grant accommodations for whatever reason, a student with a disability has the right to choose how they are educated, even if it means choosing to attend a different section of the same course, or not taking a particular course. If it is a necessary course that must be taken for a program, and there is only one section, then perhaps it may be a better option to take the course through a distance learning program or from another institution. It is very easy to get caught up in a costly effort to enforce accessibility and accommodations in one section of one class, but it is important to remember that there are ways for students to make their feelings known that can have longer term effects.

If a student with a disability chooses to stick it out in a course that is manageable, though not entirely accommodating, many institutions have course evaluation forms that can be filled out at the middle or at the end of each course. These forms may seem like a fairly impotent solution, but they give feedback directly to the instructor, as well as hold influence over their chances at getting pay increases and other work-related benefits. Students can also let each other know about negative experiences they have had with specific instructors, so that enrolment in the offending courses decreases. Students are not just knowledge sponges. They are education consumers, and it is the money spent by students that helps to decide how universities grow and change over time. Taking advantage of the right to be effectively educated is an extremely beneficial course of action, but it is

equally important and beneficial to take on the responsibility of making specific educational needs known and helping education providers understand how they can best serve students so that as much quality accessible education as possible can be delivered.

Accessibility in the Classroom

Now that we have outlined the process of ensuring that students with disabilities are accommodated in post-secondary education, we will look at what sorts of accommodations are available in the classroom, and in what ways they can best be taken advantage of. In this section, we will be discussing types of accommodations and how they can best be used, rather than discussing specific products. Those who are interested in learning more about Accessible Technology (AT) and what types of devices and training are available can visit the following two resources:

1) The website for the Canadian Assistive Devices Industry has links to numerous databases of AT products, venders, and organizations who may be able to give you more specific information about the best AT for a given disability and situation. The extensive and comprehensive site can be found at www.at-links.gc.ca/AS/zx22000E.asp?t=4

2) The Adaptech Research Network, based out of Dawson College in Montreal, conducts research to assess how post-secondary students with disabilities use accessible technology, as well as how mainstream technologies can be used accessibly. It also provides links to informative videos on AT and has a database of free or low-cost pieces of accessible software: www.adaptech.org

Where Does Accessibility Begin?

When most people start to think about educational accommodations, they immediately envision technologies that allow people with certain impairments to adapt to the rest of the world, such as screen reading software or wheelchair ramps. But technology is only one aspect of accessibility. Without an environment that is conducive to learning, students will have a hard time succeeding even with the best technology money can buy.

So, from the student's point of view, the first step to accessible educational experience is the first step made on campus and ultimately through the classroom door. The concept of Universal Design (UD), which considers the accessibility of a physical environment, is more of a concern now than it ever has been. But there are still buildings on campuses across the country with inaccessible or awkward stairways, hallways that are too narrow for comfort, and inadequate accessible washroom facilities. If nature calls and the closest washroom you can make use of is half way across campus, even the most interesting lectures can seem excruciatingly slow. Only so much can be done about pre-existing buildings, but this shortcoming spells opportunity for any students with disabilities to advocate for universal design on their campus. If there is a committee on your campus which discusses and oversees UD efforts, join them; if one does not exist, a brief conversation with the Disability Services Office and the campus department of architecture and planning should make the need for such a committee obvious. Quality education requires that students' logistical concerns be looked after.

An important consideration to accessible spaces is appropriate signage. Much confusion and frustration could be avoided if signs were designed and placed to be as widely visible as possible. This includes considering placement of building, event, and campus restaurant signs, as well as classroom and office numbers and notices that may be posted on bulletin boards. Using high contrast colours and large, easy to read fonts, and minimizing potentially confusing graphics could allow students with a wide range of visual, perceptive, and cognitive issues to more easily find the information they need to make their way around campus. All of this brings us to the classroom door.

When any student enters a class before lecture, the first thing he or she does is find a good seat. Is there enough legroom? Will I be able to get a left-handed desk? Do I need to plug in my laptop? Will I be able to hear the professor? These are concerns shared by students with or without disabilities. However, additional considerations can make finding a good seat all the more difficult for students with disabilities. Will I be able to see the board or display? Will I be able to read the professors' or teachers' lips? Is this a good spot for recording? Will my wheelchair fit anywhere at all? A student's disability can very easily limit their seating choice to only one or a handful of options. It is necessary to try to arrive early to stake a claim on a seat that may be required to take part in the class at all, and if this is impossible, then a student with a disability must make others aware of their situation so that a friendly classmate may volunteer to save a seat on a regular basis. Universal Design both on campus and in the classroom, along with the understanding of fellow students and staff, can make accommodating one's education much less difficult.

How a student with a disability chooses to work within the lecture depends on their disability as well as their personal learning strategy. The professor has one main goal in any course: to get a certain amount of information into students' heads. They may choose to do this in a variety of ways, such as by conducting a more traditional "chalk and talk" lecture, employing more modern technologies such as PowerPoint slides or other digital presentation systems, or drawing on overhead projector sheets. Any of these formats may be appropriate depending on the content of the course. Similarly, it is up to the professor to decide if they want to post lecture notes or recordings online on a course website or to make use of a textbook from which to assign readings. On the other end of this exchange, it is up to the students whether or not to attend the lectures, how to take notes most effectively if at all, how to best work on any assignments the course requires, and whether or not to record the lecture for later review. Hopefully, after all of these decisions have been made by both parties, the students and professors will be satisfied with the results obtained from their individual efforts.

A variety of technologies exist to help students with disabilities get the most out of lectures. Students with visual impairments have an assortment of magnifiers at their disposal for examining objects and text that are both close up or far away. Students who are hard of hearing may benefit greatly with an assistive hearing device or a short range FM system if their professor is willing to wear a microphone during lecture. Several companies develop software that allows computers to be effectively used by people who are blind, visually impaired, or affected by a number of learning or cognitive disabilities. If a student's disability prevents him or her from taking notes in class effectively for any reason, it may even be advisable to recruit or hire a note-taker. This can either be done informally by seeking out willing classmates, or formally through contact with the campus Disability Services Office. For a more complete overview of the types of technology that are available for people with disabilities, please refer to the "Technology by Disability" matrix after this section.

Accessibility Outside the Classroom

Much like in the classroom, how a student handles his or her own needs with regards to accessibility and accommodation outside the classroom is entirely up to them. First, the student must know their own limitations and needs. If they need an isolated study area, for example, then it is important to find out where one can be found on campus or at home. If a student needs recommendations as to what sorts of adaptive technology would be best for them, it may be advisable to see if the campus' Disability Services Office has an adaptive technology specialist on

hand. It also wouldn't hurt to check out the Canadian Assistive Devices Industry website mentioned earlier in this section. If a student requires course materials in an alternate format, the easiest way to take care of this would be to register with the Disability Services Office so that they can make the necessary arrangements through whatever process they may have already worked out. However, if the student would like to have a little more control over the process, it might be more suitable to either contact the publisher of the material directly and enquire about their process for obtaining material in alternate formats or simply scan the document and magnify the image or process it through an OCR (Optical Character Recognition) piece of software.

Of course, a disability is not an excuse for failure to complete assignments on time. However, it can limit a student's ability to do so for all assignments. Keep the lines of communication with professors open and transparent. If a problem arises and you aren't able to finish an assignment or project by the deadline, there is no harm in asking for an extension for personal or medical reasons. It won't be the first time such a thing has ever been asked for, so don't let pride get in the way of better grades. Accommodations are very much a personal choice, and only the individual student knows their own abilities and limitations. Once the student understands what they need and realizes that help is available for the asking, the road to quality education is all the more smooth.

What About Exams?

Nearly every course of post-secondary education has a midterm or final exam. This is when accommodations need to really be taken seriously by the institution. To be effectively examined and given a fair mark for the course, special considerations must be taken into account so that a student with a disability can take the exam to the best of their abilities and be on an even footing with their able-bodied counterparts. Depending on the student's needs, exam accommodations may include a private exam room, the use of a computer with assistive software on it, a reader or scribe, having the exam adapted to an alternate format such as large print or braille, specialized seating, and extra time. These accommodations are typically orchestrated by centralized Disability Services Offices, and it is always a good idea to check in with them early regarding their exam accommodation policy and schedules, as exam heavy periods of the semester can be tough to manage. It would be wise to consult with both your professor and the Disability Services Office regarding exam accommodations for each course so that the process can run as smoothly as possible. If you plan to use exam-related accommodations, it is important to assure that you follow whatever formal process is in place at the school.

Conclusion

Organizing adequate accommodations for an entire post-secondary career may seem like a daunting task for any student. On top of the lectures, assignments and exams, a student with a disability has to worry about coordinating their timetable with professors, other students and the Disability Services Office, just to ensure that they are getting as much as possible out of their classes. Fortunately, there are many technologies available to help with productivity, and the procedures associated with accommodations are fairly well established. Also, the use of available accommodations and the feedback obtained from disabled students about them is crucial to helping improve these services for future students.

Rights Within the Workforce: A guide for employers

Researcher Jessica Cowan-Dewar explains in the first section of this guide that significant attitudinal barriers still exist for individuals wanting to enter into science and technology fields. Employers continue to hold misperceptions during the hiring process. As such, there is a great need for communication and partnership between Canadian employers and individuals with identified disabilities wanting to enter into these fields. In this section, we will highlight the paths to this partnership and the employment rights that can assist individuals into breaking into these markets. Knowledge and communication are required to bridge this gap.

The results of the NEADS 2008 study regarding people with disabilities in science and technology sectors revealed that individuals with identified disabilities are grossly underrepresented in fields such as math, chemistry, physics, environmental sciences, geology, information technology and engineering. Employers often hold misperceptions that these positions are 'not suited' to individuals with disabilities (Jessica Cowan-Dewar, 2009). This is especially true of visible disabilities, where employers may believe that the environment cannot cater to the individuals needs. These attitudinal barriers act to prevent individuals with disabilities from obtaining employment in these fields. This stigma and mentality is often also found in science-focused academia, and many students with disabilities are discouraged from engaging in science studies. These misperceptions are both false and discouraging for many individuals, who may be put off by the process of obtaining education and employment in these fields.

The myths and misperceptions outlined below are commonly held by many educators and employers in science and technology fields.

MYTH #1: Accommodations are costly and require significant resources

The lack of awareness around accommodation acts as a significant barrier. There is often a resistance to employ individuals with disabilities, especially those with acquired brain injuries, mental health issues, chronic illness, etc. (Jessica Cowan-Dewar). This is largely based upon the perception of costs and resources that would be demanded of the company. According to AccessSTEM (2009) the costs of accommodations are often less than employers expect and are usually easy to implement. According to the Job Accommodation Network (as cited by AccessStem) half of all accommodations cost less than $500. Furthermore, one fifth of accommodation requests cost nothing at all. (AccessSTEM, 2009).

Funding for Workplace Accommodation Costs

The Canadian government funds tax credit initiatives designed to encourage employers to hire and accommodate individuals with disabilities. "Employers and businesses may deduct the amount they paid during the taxation year to make certain modifications or alterations to a building for purposes of accessibility to persons with disabilities. These amounts are thus claimable as current expenses, rather than using the Capital Cost Allowance method. The treatment of these accessibility-related expenditures as current expenses is set out at sections 20(1)(qq) and 20(1)(rr) of the Income Tax Act (ITA) Only those expenditures specifically prescribed by regulation are covered" (Beatty, 2004). This credit includes making large structural changes necessary for individuals with mobility impairments including: installing ramps, installing electric door openers, bathroom modifications. Additionally, this includes many accommodations for those with visual and hearing impairments such as:

elevator car indicator; Braille panel or audio signal; visual fire alarm; listening devices for group meetings; and disability-specific computerized software. This incentive provides further assistance to employers to make the appropriate accommodations for employees with disabilities.

Each province differs in the number of resources made available for accommodations. In Ontario, employers are provided with a 'Workplace Accessibility Tax Incentive' (WATI) to assist companies in making these structural provisions (ramps, modified elevators, and bathrooms)." It also includes the purchase of devices or equipment that is required by an employee to perform job duties." (Beatty, 2004).

MYTH #2: Determining accommodations requires much time and effort
Employees are the best resource for assessing which accommodations are needed within the workplace. Each individual is different and there is no set checklist of required accommodations based upon disability type. Communication between employee and employer regarding what is needed for a happy and healthy work environment will eliminate any guesswork from determining which accommodations are best (AccessSTEM).

If the communication exists and there is still confusion as to how to proceed with accommodations, it might be useful to contact local community organizations that work to serve individuals with disabilities (AccessSTEM, 2009). These supports are useful resources for employers to navigate in setting up accommodations.

MYTH #3: Employers are solely responsible for providing all accommodations
While it is true that employers should be facilitating accommodations within the workspace, employees are responsible for their own day-to-day accommodations (for example, a wheelchair). According to AccessSTEM, the company should cover all accommodations as they pertain to the job and anything that requires onsite modification. However, personal accommodations to facilitate daily activities remain the personal responsibility of the individual.

How to Recruit Eligible Employees with Disabilities

This section outlines select programs and services identified as helpful for employers in the recruitment of persons with disabilities.

NOWS: NEADS Online Work System

A bilingual, free, online tool where employers can post opportunities and search for job-ready candidates with disabilities. These candidates are either students or graduates who self-identify as having a disability/impairment. The service is operated by the National Educational Association of Disabled Students (NEADS): www.nows.ca

Workforce Recruitment Program (WRP)

A recruitment resource for identifying persons with disabilities as job candidates for employment in a number of fields. Through their Outreach Program for Youth with Disabilities, Microsoft develops partnerships with potential employers and conducts disability awareness and sensitivity training with these employers: www.wrp.gov

AccessSTEM
The Alliance for Students with Disabilities in Science, Technology, Engineering and Mathematics is a program operated out of the University's of Washington's Do-It program: www.washington.edu/doit/Stem/

Job Accommodation Network
A service offered in Canada the Canadian Council on Rehabilitation and Work: www.jan.wvu.edu/links/employ.htm

Ability Links
A job opportunity website for persons with disabilities and inclusive employers: www.abilitylinks.org/home.aspx?&PageID=506

Model examples of Science & Technology companies who implement the inclusion of individuals with disabilities include some of the following organizations:

Bender Consulting Services of Canada, Inc.
Has a mission to provide consulting services while creating employment and career opportunities, independence and freedom for people with disabilities. Visit their website at: www.benderofcanada.com

NASA
Goddard Space Flight Centre's Program for Individuals with Disabilities. This program addresses this barrier through organized internships that promote the hiring and advancement of people with disabilities. Visit the NASA program website at: www.eeo.gsfc.nasa.gov/disability

Another valuable, comprehensive Government of Canada resource is Persons With Disabilities Online: www.pwd-online.ca

Conclusion
Within Canada, employers are required to accommodate individuals with disabilities within their work environment (short of causing undue hardship). It is suggested that employers treat accommodation requests in a respectful and urgent manner. Understand that disclosing a disability may be intimidating for many individuals and should be treated with confidentiality. Refrain from asking disability related questions that are not relevant to the accommodations needed. Acknowledge that temporary accommodations may need to be set in place until long term solutions can be resolved and be open to the employee in question contributing to this process. Finally, it is important to remember that everyone is different, and accommodations will vary depending upon employees particular needs. It is believed that accommodation works best if approached in a cooperative and collaborative manner.

Technology Matters: Creating Usable Working Environments

By Gladys Loewen, Independent Project Consultant

The explosion of electronic technology along with the switch from analogue to digital format has created a unique opportunity to expand beyond traditional methods of reading, writing and communicating. Technology, including assistive technology (AT), offers the opportunity to enhance the design of the workplace to create flexible, inclusive environments for a broad range of employees. The primary purpose of using AT is to enhance capabilities and remove barriers to performance based on function rather than a specific disability (Illinois Assistive Technology Program, 2005; Zabala, 1990). In fact, AT can offer the best and sometimes the only way for people with disabilities to perform certain job related tasks that non-disabled employees do in other ways (Illinois Assistive Technology Program, 2005; O'Halloran, 2009).

Employees come from a range of diverse backgrounds that include differences in disability, race, religion, language, family configuration, education, age, and community involvement. This diversity has required employers to establish flexible approaches to hours of work, religious holidays, cultural attire, and childminding. Now it is time to establish flexible approaches to hiring employees with disabilities (Ministry of Employment and Income Assistance, 2007). Assistive technology creates opportunities to remove some of the traditional employment barriers for disabled persons by:

- Reducing the dependence of persons with disabilities on human support for reading, writing and communicating (Barclay, Lilburn, Loewen, Nobel & Tomassetti, 2002; Burgstahler, 2003);
- Increasing productivity (O'Halloran, 2009);
- Promoting empowerment (Burgstahler, 2003; Zabala,1990);
- Offering greater participation in the workforce for disabled adults (Illinois Assistive Technology Program, 2005; Loy & Batiste, 2008).

Using AT to perform work-related tasks is considered an employment accommodation. The definition of employment accommodation includes any modification or support that allows employees to perform tasks which includes the alteration of architectural building features, adaptation of work procedures, reorganization of job duties, and provision of necessary tools to perform job tasks (Illinois Assistive Technology Program, 2005; Minister's Council on Employment for Persons with Disabilities, 2004).

A Canadian government report on employment equity noted that employers have been more proactive in providing accommodations to persons with disabilities, especially those with physical disabilities (Human Resource and Skills Development Canada, 2005). Employers have offered equipment and devices such as large screen monitors and voice recognition software as well as made building modifications to improve access for individuals with disabilities; however this report did not offer statistics on how employers have implemented the use of assistive technology to enhance job performance. A British Columbia study on recruitment and retention of persons

with disabilities identified inadequate workplace accessibility, accommodation, and employment supports as key issues (WCG International Consultants, 2004). Disabled employees are expected to multi-task and handle multiple roles in order to perform a job and retain it. Without access to appropriate AT and training on how to use it to perform job related tasks, disabled employees may find it difficult to obtain and maintain employment. Student users of AT typically utilize basic features of their technology to do research, access the internet, send email, and format text documents in order to do their coursework. However on the job, they may be required to share appointment schedules, respond to customers, use a spreadsheet to manipulate real numbers, organize numbers for a report, utilize relational databases, use accounting software, make decisions on the information, and perform tasks in multiple settings. Different AT may be required to perform these work-related tasks.

An assessment of the employee's skills as well as the software and hardware used within the company may be necessary to determine the appropriate AT for an employee. The Job Accommodation Network identified five steps in determining the appropriate AT to enhance job performance (Loy & Batiste, 2008):

- **Define the situation:** Determine what job functions need to be accommodated by evaluating the individual's work site, work station, and work activities and job requirements;
- **Explore available AT options:** Consult with the employee to identify experience with AT, knowledge of options, and proficiency with AT options and software used by the company;
- **Choose AT:** Consider compatibility, local technical support, warranty, training, and upgrade options when finalizing an AT plan;
- **Implement AT:** Consider configuration of the equipment, training, and setup of workstation in order to maximize the use of the equipment;
- **Monitor and upgrade AT:** Monitor the effectiveness of the technology to ensure that the AT is meeting the needs of the employee and employer. Over time the equipment will require maintenance and upgrade, so this needs to be factored into the monitoring process.

Another key to employment success is the design of the environment. An inaccessible workstation without the appropriate tools positions an employee with a disability for failure; this situation puts the focus on the disability as the source of the problem rather than the design of the workplace environment. Disability scholars and researchers promote the principles of universal design (Burgstahler, 2003; Illinois Assistive Technology Program, 2005; North Carolina State University, 1997) and the Social Model of Disability (Gill, 1994; Oliver, 1990) as these paradigms reframe disability by removing the focus from the person's impairment, shifting the problem to the design of the environment and the removal of barriers in the environment. These paradigms shift old assumptions that disability is the individual's problem toward a revised focus on the creation of environments that are usable by the greatest number of people. This new view of environmental design reduces the pressure on the disabled person to fit into an inflexible environment and the need for individualized accommodations. This perspective assumes that:

- Persons with disabilities fall along a continuum of differences rather than constituting a separate category of learners and workers;
- Employer adjustments for differences should occur for all employees, not just those with disabilities;

- Job processes should be made flexible to accommodate worker differences; and
- The person designing and creating the environment is responsible for making it sustainable, equitable, inclusive and usable.

Since technology is so commonplace in our society today, it is appropriate to explore ways in which technology can be used to increase employment opportunities and promote greater independence for disabled employees. The following solutions are not exhaustive and are meant to stimulate ideas and strategies in order to promote the creation of useable, inclusive, equitable, and sustainable working environments for a diverse group of employees:

Note-taking

Employees who cannot read the screen during a presentation can receive the presenter's PowerPoint file prior to the meeting and follow along with the PowerPoint on a separate laptop during the presentation.

Colleagues can post meeting notes on a website to reduce the need for notetaking assistance during company meetings.

A lapel mic can be used to record a speaker's presentation; it can be posted on the website as an audio file for later use or distributed through email. This eliminates poor quality recording of lectures by employees due to the quality of the mic or the distance from the speaker.

Smart board technology offers the opportunity to transfer written notes to the employee's computer for future use.

A PDA can be used for notetaking, scheduling, communicating, and documenting reference information.

A digital camera can take a photo of a complicated math or science formula or problem for review at a later time.

An employee can record a lecture directly on a laptop using special software without having to carry another recording device. The audio files can be saved and managed for future use.

Communication

Using a soundfield system during meetings and presentations allows employees who have difficulty with hearing, concentration, attention, and understanding language to hear the speaker more directly by reducing the noise to sound ratio.

Digital assistive listening devices (ALD) can be attached to many digital hearing aids, making the use of an ALD less obvious and more practical.

An employee with speech difficulty can use a computer with a speech output system to do an oral presentation. Alternatively the employee can give the oral presentation and provide a print copy of the outline or document, allowing participants to follow along during the speech.

Email and instant messaging options allow a person with speech difficulties (deaf, non-verbal) to communicate with colleagues without the use of an interpreter or another person.

A PDA can be used by deaf employees to contact interpreters for changes in work schedules, meetings, appointments, and other situations that require interpreting services. This eliminates the need to access a TTY (telephone for the deaf) or use of a message relay centre.

The use of remote captioning transmits an audio presentation over the Internet to a computer used by a deaf employee for a meeting when a local captionist is not available.

A portable phone amplification system offers increased hearing with any phone.

A vibrating pager can be used to contact with a deaf person in a noisy environment like a factory or laboratory.

Reading

Mac and PC have accessibility features built into the operating systems that include options such as simple text magnification, screen reader, cursor enhancements, key latch, and keyboard input options. The user is able to customize the settings to meet individual needs for reading, writing and communicating.

A language master (hand-held spell checker with pronunciation) can be used when access to a computer is difficult; this ensures that employees with spelling difficulties can produce better quality of written work when away from a computer or a print dictionary.

A scanning pen can assist with obtaining the pronunciation and definition of a word while doing research in the library or away from the office for persons with language difficulties.

Portable CCTV (closed circuit TV) systems provide employees with vision difficulties the ability to read print documents in multiple environments.

E-text books and manuals provide the ability to read documents on MP3 and e-text players in any location.

Talking dictionary and thesaurus software programs are useful for employees with a variety of learning or language difficulties.

A talking calculator ensures that employees who experience difficulty with print to read the numbers accurately, reducing human error in mixing up numbers.

Audio recording of a print document is useful for employees who have difficulty following print instructions.

Adapted rulers and measuring tapes can be used to measure accurately with oversized, bold numbers and lines or auditory output.

A Braille labeller provides the ability to label items for ease of access.

Writing

The opportunity to email documents to work colleagues reduces the need to use a printer and carry the printed documents for persons with hearing difficulties, visual impairments and physical disabilities.

Organizational software programs provide templates and visual maps to assist with organizing ideas to support the writing process for writing reports and briefs.

Text-to-speech software allows for options such as word prediction, highlighting words that are being read, talking dictionary, spell-check, and auditory output.

Braille notetakers allow for spell-checking for homophones, names, places, and foreign words.

A refreshable Braille display allows for accuracy in reading scientific or mathematical material and equations.

Specialized math software allows for dictation of math and science problems into a word processing document for struggling writers.

Privacy

The employee can use a headphone for privacy when using technology with speech output.

A refreshable Braille display offers the employee the ability to read confidential material in front of a client while maintaining privacy.

Baffles around a workstation offer increased privacy for employees who get distracted easily or need a quiet workspace.

Training

Videos and virtual reality programs can offer virtual experiences for employees who are unable to physically perform the task but need to understand how the task is done.

Training sessions and meetings can be videotaped and posted on websites for future reference and review; this is also useful for employees who are unable to attend due to illness, health issues or family crisis.

Company manuals can be put into digital format in order to use AT for reading the documents.

Ergonomic Options

Alternate keyboards and mouse options can be used to offer different angles, reduce repetitive actions, and provide efficiency of reach.

Height adjustable tables allow for customization of workstations.

A document holder reduces the requirement to hold books and documents and offers an ergonomic angle for reducing tension on the neck.

A raised edge around work station prevents items from rolling off.

A swivel chair offered ease with face-to-face communication.

Good lighting optimizes eye strain and facilitates speech reading.

Headlamps offer targeted lighting allowing the person full use of their hands.

Conclusion

As technology devices change and evolve, strategies for using technology on the job advance and improve, allowing a diverse population of disabled adults to achieve increased success on the job and participation in the workforce. Effective and supportive employers allow for opportunities to incorporate technology in new and innovative ways. Blackhurst (2001) sums it up by saying that

"while ability to use a technology device is still important, primary emphasis should be placed on arranging circumstances to enable the device to be used in the most effective and efficient manner."

By changing the design of the job environment to support the diversity of employees, employers will ensure that employees are able to demonstrate their knowledge and skills in a flexible and inclusive environment. Technology matters in ensuring disabled employees have the opportunity for full participation in the workforce.

> *"There is no question accommodations can be expensive depending on the severity and type of disability and the individual; however employers who experience accommodation will say it's priceless (e.g. adaptive equipment). I don't think employers understand technology available – when they become aware, they are blown away. For example, regarding accommodation of two quadriplegic employees at a provincial crown corporation – the employer was amazed at the technology available."*
>
> *(Minister's Council on Employment for Persons with Disabilities, p. 22)*

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Finding Funding to Accommodate Employees with Disabilities

If a company or organization doesn't already have a fund set up to accommodate employees they may want to hire who require accommodations due to disability, and they don't have the necessary funding available, federal and provincial governments are ready to step in and help. Here is a list of links to information on federal and provincial funds designed to help prepare individuals with disabilities for the workforce, train employees with disabilities for various jobs and industries, and provide employers with the funding necessary to make workplace accommodations for employees.

Canada-wide

Opportunities Fund

www.hrsdc.gc.ca/eng/disability_issues/funding_programs/opportunities_fund

British Columbia

Employment Program for Persons with Disabilities

www.eia.gov.bc.ca/pwd/eppd.htm

Alberta

Disability-Related Employment Support

www.employment.alberta.ca/CES/3159.html

Saskatchewan

Employability Assistance for Persons with Disabilities

www.aeel.gov.sk.ca/eapd

Manitoba

Manitoba doesn't seem to have specific funding for employee accommodations. However, section 144 of the provincial manual for the Family Services and Housing Department outlines funding availability and requirements for education and vocational training for persons with disabilities.

www.gov.mb.ca/fs/vrmanual/144.html

Ontario

Ontario Disability Support Program

www.mcss.gov.on.ca/mcss/english/pillars/social/odsp

ODSP Employment Supports

www.mcss.gov.on.ca/mcss/english/pillars/social/odsp/employment_supports/

Quebec

Governmental Support

www.emploiquebec.net/individus/handicap/index_en.asp

New Brunswick

Training and Employment Support Services

www.app.infoaa.7700.gnb.ca/gnb/Pub/EServices/ListServiceDetails.asp?ServiceID1=17056&ReportType1=All

Nova Scotia

Diversity Accommodation Fund

www.gov.ns.ca/psc/v2/employeeCentre/diverseWorkforce/accommodationFund.asp

Prince Edward Island

PEI Disability Support Program

www.gov.pe.ca/hss/peidsp

Newfoundland

Independent Living Resource Centre

While this organization doesn't have a central fund for employers to accomodate employees with disabilities, it does provide a list of organizations for various disabilities which may have their own funding sources.

www.ilrc.nf.ca/nldisabilityorgs.htm

Yukon

The following website contains a list of disability resources, though nothing specific on funding for accommodating employees with disabilities.

www.hss.gov.yk.ca/programs/social_services/disabilities

Northwest Territories

While there is no specific fund set up for persons with disabilities, the website for the Northwest Territories branch of the Active Living Alliance may be able to provide further information on resources.

www.ala.ca/Content/Prov-Terr/NWT/NWTHomePage.asp

Individual Rights Within the Workforce: A guide for employees

The Canadian Charter of Rights and Freedoms states that individuals with disabilities have the right to be treated equally. This includes the process of obtaining satisfying employment. As such, it is important for individuals with disabilities to be aware of their employment rights, and of the hiring process, when entering into these career fields. This section seeks to address the common concerns employees with disabilities and their employers may share. It examines some of the organizations that are available to help and procedures an employee should understand in the steps which need to be taken to deal with discrimination in the workforce.

Accommodation and the Interview Process

Interviewing for a job can be an anxiety-provoking process for anyone. For those who have experienced any form of bias or discrimination based upon their disability, this process may be disheartening and overwhelming. Self advocacy should be an individual choice. Therefore, the following are only suggestions for strategies in effectively preparing to discuss disability and potential accommodation needs with an employer during a job interview.

When preparing for an interview, organization is key. It is important to have an understanding of the job description, and know what personal accommodations you might require within that particular work setting. Coming to the interview prepared with a list of suggestions on how the company can accommodate may demystify the accommodation process for the employer. Additionally, it is useful to be aware of what government tax incentives will cover in terms of accommodations. Being open, communicative and willing to educate an employer on these issues will display your motivation, attention to detail and ambition to get and do the job.

In a recent article in *Jobpostings* magazine, Ileana Brito discusses how to present accommodation requests to potential employers. That article is presented on the next page.

Becoming a Self-Advocate

by Ileana Brito, Jobpostings Magazine

"You're hired for your strengths not for your deficits or challenges. Your focus should be on what you can do and on articulating that to the potential employer"

Julie Ouellette, Disabilities Counsellor,
Paul Menton Centre, Carlton University

What is self-advocacy?

Self-advocacy is essentially about knowing yourself, being able to promote yourself and your skills while speaking to any challenges you may face because of your disability, and being able to request the accommodations you need.

How to become a successful self-advocate

Self-advocacy is a skill that is developed. It takes practice. It's not just enough to know what skills you bring to the job market and what accommodations, if any, you need to help you succeed, you need to be able to clearly and effectively communicate this to a potential employer. Self-promotion can feel a little awkward or uncomfortable so practicing this skill is key. You want it to feel and sound natural.

Tip: If you want help practicing this skill or just want some feedback, be sure to check with your campus' disability services office or career services. The advisors are there to help you.

Identify your disability

To promote your strengths and skills and to know whether a position will pose any challenges for you means you need to understand your disability. What is it? How does it impact you?

Know what you want to promote. Take stock of your skills and your strengths:

What do you have to offer an employer?
What are your best strengths?
Why would you be a good fit for the position?
Why would you be a good fit with the company?

Again, if you need help determining what your strengths are, there are a number of resources you can turn to:

Career Services – an employment advisor can help you take stock of your work, volunteer, recreational and educational experiences to determine what skills you've been honing. They can also help you communicate these skills effectively in written form (résumés and cover letters) and in person (interviewing skills).

Previous Employers – if you have a good relationship with a previous employer (whether it was paid or unpaid work), talk with them and find out what they see as your greatest strengths.

Friends & Family – ask them what they see as your greatest strengths.

Do your homework. Know what types of accommodations are helpful to you

Know what accommodations you need. If your accommodation requires the employer purchasing something, do your research and find out what the cost is and where the accommodation can be purchased. And, advises Ouellette, "Try to have alternatives. Giving employers options often makes it easier to implement the accommodation."

Be able to articulate your needs clearly

When it comes to requesting accommodation, know that it is your RIGHT to ask for the accommodations you need. And, remember that you do NOT ever have to disclose the nature of your disability to request an accommodation; all the employer needs to know is what accommodation you require.

"It's important to be able to look at the job description and know that you can perform the essential requirements of the job. If you can perform those key requirements, then know that it's your RIGHT to request the accommodation," adds Ouellette.

Cons of not asking for a necessary accommodation

Ultimately, the decision as to whether or not you request an accommodation lies with you. It is important to consider that not requesting an accommodation you need could lead to failure on-the-job.

"If you neglect to make that disclosure and there is a health concern that potentially endangers yourself and your coworkers, you would be in a difficult situation," says Charlie Matjanec, Employment Advisor, Disability Services at Conestoga College's Kitchener campus. He adds, "If you're not asking for the accommodation, you're giving away an advantage that you are legally entitled to and that you worked hard to give yourself. But, you always have the right to not say anything."

Deciding when to request an accommodation

Deciding when to request accommodation depends on a variety of factors and is completely up to you. But, there are some things you should take into consideration:

1. Will you need accommodation during the interview process? I.e. Do you need to ensure appropriate access to the interview location? If so, it is advisable to request the accommodation up front so neither you nor the employer is put in a difficult situation.

2. Do you need accommodation during written tests? The recruitment process can involve written tests, especially if you're interviewing for a government position, so if you need extra time to complete a written test or require adaptive technology to do so, you might want to seriously consider requesting the accommodation beforehand. If you don't, your poor performance will likely be attributed to weak skills.

What if I don't need accommodations during the interview?

"If the offer has been made, this is a really good time to consider making the request," says Matjanec. "You have already proven that you have the qualities that they're looking for. The employer has a legal obligation to accommodate if the candidate chooses to accept the job. If an employer offers you the job, what has changed when you say, 'That's great. I'm going to ask you for some adaptive technology on my computer because that is how I'm best able to do my job.'? This is where

advocacy comes in, the more that you are able to project that you have faith in yourself, the more the recruiter will believe you. If you're hesitant, it will come across in the same hesitant way."

Ouellette adds, "You don't need to tell everyone. You may be able to just tell your direct supervisor. 'Okay, this employee needs a desk that is three inches lower.' Not a big deal."

For more tips on how to communicate your needs within the workplace and strategies for how to educate your employers and coworkers about physical and social accommodations within the workplace, check out the Jobpostings magazine article at the end of this section, which can also be found at: www.neads.ca/en/norc/jobpostings/jp_educate_employer.php

For individuals who want to ensure that the workplace they enter is inclusive, one can also apply for jobs in the science and technology fields through organizations that match individuals with disabilities within these sectors. Utilizing local disability service providers may be an effective way to be certain of applying for jobs that are inclusive.

Lastly, remember: all employees and job seekers have legal rights. Knowledge is power, so knowing what rights employees have is crucial. If discrimination within the workforce occurs at the interview stage or during the time of employment, there are organizations across Canada that assist in helping individuals build cases to fight against inequality.

For more information on the rights of people with disabilities in the workplace, please consult:

Government of Canada: Persons with Disabilities Online
www.pwd-online.ca

Canadian Human Rights Commission
www.chrc-ccdp.ca

Ontario Human Rights Commission's Policy and Guidelines on Disability and the Duty to Accommodate, Human Rights at Work
www.ohrc.on.ca.

To file a complaint, please contact the Human Rights Tribunal of Ontario at:
Toll Free: 1-866-598-0322
TTY Toll Free: 1-866-607-1240
Website: www.hrto.ca

To discuss your rights, or if you need legal help, please contact the Human Rights Legal Support Centre at:
Toll Free: 1-866-625-5179
TTY Toll Free: 1-866-612-8627
Website: www.hrlsc.on.ca

Alberta Human Rights and Citizenship Commission
www.albertahumanrights.ab.ca

British Columbia Human Rights Tribunal
www.bchrt.bc.ca

Manitoba Human Rights Commission
www.gov.mb.ca/hrc

New Brunswick Human Rights Commission
www.gnb.ca/hrc-cdp

Newfoundland Human Rights Commission
www.justice.gov.nl.ca/hrc

Northwest Territories Human Rights Commission
www.nwthumanrights.ca

Nova Scotia Human Rights Commission
www.gov.ns.ca/humanrights

Prince Edward Island Human Rights Commission
www.gov.pe.ca/humanrights

Québec - Commission des droits de la personne et des droits de la jeunesse
www.cdpdj.qc.ca/en/home.asp

Saskatchewan Human Rights Commission
www.shrc.gov.sk.ca

Yukon Human Rights Commission
www.yhrc.yk.ca

Marie-Eve Veilleux – Disability in Science: A Student's Success

Marie-Eve Veilleux was a speaker at the NEADS conference in Ottawa in November 2008. She told delegates in the workshop presentation that when she was 18 months old, she was diagnosed with a severe form of arthritis that caused extensive mobility problems and progressively destroyed her knees, hips, wrists, and fingers. This made writing and carrying books extremely painful, and her academic life even more difficult. The disease attacked all her joints. After many painful surgeries, Veilleux regained the use of her legs, "but it is still hard to walk," she said.

Veilleux, who holds a Bachelor's degree in Microbiology and Immunology, began studying at McGill University out of pure interest in learning more about her condition, although she knew she would never be able to work in a lab. Pursuing a science degree – which involves working in labs, writing papers, and conducting research – was not the easiest choice. She was at the conference to prove that it was possible, "because I did it," said Veilleux.

She explained that she collaborated with the Office for Students with Disabilities at McGill to find creative ways to meet her degree requirements. Her strategy was to involve people every step of the way. Common accommodations were available to her from the very beginning, for which Veilleux was grateful. However, she said, she wished to elaborate on some of the difficulties that students with disabilities face in science programs involving laboratory work.

The visually impaired are particularly challenged when asked to use microscopes to identify the color of bacteria, for example. Veilleux said she was unable to perform some of the most elementary tasks, such as handling a pipette or doing up the buttons of her lab coat. She was provided with a personal attendant whose duty was to do what Veilleux could not – tie her hair, put on her gloves, perform her practical exams. Veilleux would analyze the results and answer the questions.

This was not the best solution, she admitted. It was uncomfortable to continually ask someone to do things for her. So the following year, instead of being provided with an attendant, Veilleux was put in a team of three students instead of the usual two. In this way, while two students did lab work, Veilleux watched and wrote down data. Her practical exam was switched to a written exam. She would describe the experiments and the results and write a conclusion.

This new approach worked. It eliminated her anxiety and stress, thus improving her academic performance.

Veilleux encouraged students with disabilities to collaborate with university staff to find appropriate arrangements and to talk to professors directly, rather than involve a greater number of people. "Sometimes it is better," she said. "Sometimes, you just don't have the energy."

When it comes to requesting and getting accommodations, Veilleux said, there are no right or wrong answers. Students must find their own way.

The heavy course load in science is also a problem, Veilleux said. Students who are already stressed with coping with a disability could find the stress of theoretical courses overwhelming. Veilleux discovered after starting the program that she could become a part-time student, which markedly improved her grades and her quality of life. Veilleux encouraged students with low energy levels to consider becoming part-time students and to apply for scholarships. She said policies that award scholarships to full-time students only—which she is still fighting—should not prevent anyone from applying.

After completing her science degree, Veilleux learned that finding a job was not easy. Most advanced career paths that suited her physical limitations did not interest her. It was then that she discovered her passion and talent for language and became a scientific translator. Her academic goal for 2009 is to pursue a Master's in Epidemiology, a post-graduate science program that involves statistics, not labs.

Veilleux said her greatest pride was having proven all naysayers wrong. She said she hoped her example would encourage all persons with disabilities to apply to their program of choice.

Jessica Erskine: A Personal Account

Unfortunately, even with all of the resources and opportunities that are in place to help people with disabilities find employment that fits their needs and skill set, unemployment is all too common in the disabled community.

Jessica Erskine worked in technology sectors in her teens and early twenties. In university, she studied a variety of subjects, most notably psychology. After becoming disabled and requiring the use of a wheelchair for much of her mobility, she went back to school to study computer networks at CDI (now Everest College). Despite becoming disabled after having been employed, and successfully retraining at a recognized institution, Jessica has found it next to impossible to find a relevant job in her field. She has found the level of accommodation for wheelchairs ranging from lacking to non-existent both at the college itself and at the workplaces at which she has applied. She has found employers whom she has approached regarding her accommodation to be more concerned about the liability of hiring a person who requires a wheelchair than the qualifications she brings to the table. No amount of job searching, networking, following up on potential leads, or self advocacy has opened any doors for Jessica, and going bankrupt at the beginning of 2009 has only caused her situation go from bad to worse.

Overall Jessica has found her experience as a person with a disability seeking a job in the technology sector to be frustrating and unrewarding. But rather than viewing Jessica's story as a crushing blow of discouragement, we must view it as an opportunity to see how much work needs to be done. The situation won't improve if dedicated professionals with disabilities, educators, and employers don't collaborate more effectively to ensure available jobs are filled by the people who are best suited to them, rather than those who may be less qualified but who can fill the post with the least amount of effort on the part of the employer. Pressure must come from all sides to see that employment for people with disabilities improves as quickly and painlessly as possible. Jessica and many others like her need to receive support from the disabled and disability service community, encouragement from their families and peers, and compliance from employers who should not place convenience above equity.

Educate Your Employer

by Caroline George, Jobpostings Magazine (Winter 2009, pg. 14)

Treat others as you want them to treat you. Sounds simple, right? Not so. In the workplace this message may be lost on an employer unaware of what it's like for a new hire with a disability.

Communication is key

"Attitude is the biggest challenge and it's mainly because people are really not aware," explains Norma Ricker, director of project development, employment services for the Canadian Council on Rehabilitation and Work (CCRW) in New Brunswick.

Like in math, some problems have more than one solution, something Janice Shaw, support coordinator for the Epilepsy Association of Calgary, understands. In the position for 12 years now, Shaw has dealt with a number of employers and vividly recalls a client being fired after having a seizure: "He told them (his employer) about his epilepsy and that his medication was being changed and sometimes a breakthrough seizure may occur. He had a seizure and they actually let him go right away." The employee spoke with Shaw, who suggested they talk to their boss about equality within the workplace.

After this proved unsuccessful, Shaw confronted the employer, who ignored her until a phone call with the Human Rights Commission changed their decision about her client.

He was eventually rehired and promoted.

Although this scenario ended on a happy note, Ricker advises employers to identify problems before they escalate. The solution is often as simple as communication. "Talk to the individual first. People are people whether they have a disability or not."

Becoming aware of your comfort level is key to succeeding on the job. Approaching your employer and co-workers to make them aware of your challenges not only helps you, but also allows them to understand your feelings and address the issue, says Ricker.

Take down the obstacles

Don't miss the opportunity to become proactive, says Ricker of both the employee and employer. She advises setting up training sessions (which can also include staff) like those offered by the CCRW. They are also a great way to understand, confront and solve issues in the workplace.

"We would do meetings with the staff and the employer to talk about what it is to have a person with a disability in their workplace and try to dissolve the myths and misconceptions of people with disabilities in the workplace," says Ricker. "Awareness and sensitivity training is so valuable to the workplace. After we deliver this training most trainees say 'Wow I didn't realize,' or 'I was afraid to ask the question.'

It's not worth it to suffer in silence and become miserable. By speaking up and explaining your needs to your employer, in many cases they will understand and try to accommodate you.

Ask for help

Knowing where to seek help can seem overwhelming for anyone, but be aware that many organizations have job skills programs and coaches to help employees understand how to approach their employer about difficulties on the job. "The reality is that most of our clients will encounter a challenge at some point in their job, such as a change in management. This is where a job coach might step in and establish that new relationship between the individual and the new employer," says Debbie Seery, director of the Hawkins Institute in Toronto, which runs social skills programs for adults with Asperger Syndrome and learning disabilities.

"A member of Hawkins will go to work with an individual on their first day. The purpose of that visit is to make sure the individual knows where the washrooms are, what the break times are, what the supervisor's name is and establishing a comfort level. It also allows us to have knowledge of what the individual's job is as well. Should the individual have a problem on the job the employer can call and we have an understanding as well, so that's a support to the employer," explains Seery.

"I think that employers should not try to figure out or understand things for themselves," says Ricker of the problems that often result from employers who don't seek outside help. "They can save themselves a lot of time, energy and even money if they talk to professionals in advance."

"A lot of the time it's just educating the employer as to what it's like to work with someone with a disability and make it a positive experience, for both the employer and the individual," agrees Seery.

For the employer and employee unable to communicate their feelings, finding a solution can seem like a maze with no end. But if you follow your instincts the resources are there. Learning how to access them is a step in the right direction towards gaining a great work experience, experts agree.

Job Search Strategies

After graduation, the hunt for a job in science and technology sectors can often be a daunting task. Individuals with disabilities can find themselves facing additional barriers during this process: whether to disclose during the application or interview process; knowing which accommodations will be needed within different job settings; and organizing career plans and goals.

"The hardest part of looking for employment is getting started, because a job seeker must get through the confusion and the fear of failure." (Melody Choboter, NEADS Calgary Job Search Strategies Forum Report)

Creating a Career Plan

Upon graduation, many individuals are at a crossroads in their life as they assess their career goals and future plans.

During NEADS' Montreal Job Search Strategies Forum in March 2009, Daria Kowalyk provided three steps for individuals with disabilities to follow in creating a career plan:

1. ***Conduct a self-assessment, whereby you gather information about yourself: your values, skills, personality and interests.*** Use your friends, family, peers and colleagues as a soundboard when brainstorming different career paths. Really reflect upon your strengths and weaknesses and how they will impact your chosen career. Think about what motivates, excites and drives you to succeed. Where do your passions lie? Also during this time, it is important to think about your 'professional brand'.

   Much like a commercial brand, Kowalyk asserts that job seekers have a professional brand. This is how you present yourself within the workforce: body language, word choice, tone of voice etc. Ask yourself questions like, "How do I present myself to others? Do I present my ideas and work with confidence? Do I speak too softly? Do I get defensive when someone disagrees with me? Am I pleasant? How do others perceive me? Do they seek out my company? Do they ask for my advice? How well do I build relationships? How do I connect with people? In my best interactions, how did I engage with others?"

   This information should improve a job seeker's ability to confidently present him or herself to potential employers. It is important for job seekers to reflect upon how they are presenting themselves and their skill base as it is important for the job search/interview process.

2. ***Defining career goals.*** During this stage, focus on what goals to achieve within the next five years. At this point, it may be helpful to consult with mentors for advice. Kowalyk suggests that individuals ask themselves whether they want to work for a specific company, want to achieve a specific designation, role, community or type of work, and how important workplace culture is to them. Asking these questions will help focus a prospective career plan.

3. ***Finalize the plan and act on it.*** This includes networking, information interviews, job shadowing, or volunteering. Determine which experiences will afford the desirable opportunities and networks needed to attain career goals. Create and commit to an action plan, specifying obtainable career goals.

Avril Rinn is a Computer Support and Life Skills Coach for the agency ATN Access. In a recent article of *Jobpostings* magazine, she stressed the importance of having a career plan, as she herself

did not have one during her time at university. While this was a temporary setback for her career, she soon realized the importance of planning for the future and seizing opportunities that present themselves. Read the article at the end of this section, or at:
www.neads.ca/en/norc/jobpostings/jp_longjourney.php

Networking

Networking is a proven, effective way of obtaining employment, and good networking can often lead to opportunities to apply for positions even before they are widely advertised. Statistics show that 48% of people find employment through networking, 28% are hired through direct employer contact, and 13% find a job through a combination of the two. Only 8% of job seekers find a position from the classified ads and 3% through employment agencies. (Melody Choboter, NEADS Calgary Job Search Strategies Forum Report, February 28, 2009).

Networking is the process of forming connections with coworkers, classmates, supervisors, and people in day to day, academic and professional life. These connections can be either work-related or personal in nature, but the important part of networking is to keep those connections alive once forged. It is very important to try to maintain regular contact with as many people in the network as possible and keep them updated with major life changes, goals, and career or personal goings-on. With all of this personal and career related information being exchanged, it's only natural that eventually the various members of the network will obtain knowledge of career opportunities or other information relevant to one or more of their connections.

Using a network of contacts to job search can be very beneficial, because word can spread through a network faster than through official channels. Also, if a person is referred for a job by a member of their network, it is a personal endorsement, and a potential employer is likely to treat information they obtained through their own network more seriously than they would information from a résumé or application form, since the employer is hearing about the potential employee from a source that they already know to be reliable. It is important to remember that networking works because of mutual interest among its members' well being. If someone only takes part in networking to further their own career or to attain their own goals without reciprocating, other people may become less interested in sharing information as they once were, because they aren't getting anything back for it. However, if opportunities and information are shared freely between relevant networkers, it's a beneficial arrangement for all.

In an interview with Dr. Gregor Wolbring, an Assistant Professor at the University of Calgary, conducted by Melissa Bolton, Dr. Wolbring emphasized the importance of networking. Here is a portion of that interview, which is presented in its entirety later in the guide:

Q: Were the doors open for you when you completed your PhD?

A: Well, because I knew people. And I made arrangements. If I would have applied by letter, I think it would have been more difficult, simply because most people would not be able to judge my suitability and the suitability of their labs. And many of course have prejudice against disabled people.

Q: So networking was incredibly important for you?

A: Yeah of course. That's why you have to be good and people have to know you in the field. So blind applying for me just didn't work. People have to know you and your work, and that your work is high calibre. It's easier.

Applying and Interviewing for a Position

Once different employment possibilities have been researched, it is important to properly compile the application materials needed to get the job, including résumés, cover letters and portfolios. It is crucial for a job seeker to know their résumé inside and out, and ensure that it is up to date (Jeff Summers, NEADS Calgary Job Search Strategies Forum Report).

Organization is also essential during the process of applying for jobs. Keep track of the employers that have been contacted and any feedback that they have given (Melody Choboter, NEADS Calgary Job Search Strategies Forum Report).

The Interview

When preparing for an interview, the key is to rehearse. It is helpful to practice answering general questions that are typical within interviews. These include questions such as "why do you think we should hire you?" or "tell me about your experience as it relates to the position."

Ask family, peers and friends to roleplay mock interviews to prepare. Since the interview process is often anxiety provoking, rehearsing will enhance one's confidence which will translate to their prospective employer (Jeff Summers, NEADS Calgary Job Search Strategies Forum Report).

Typically, near the end of an interview, the employer will ask if the interviewee has any questions. It is best to have a couple of questions prepared ahead of time, to show interest and active participation in the interview process. Good questions to ask the employer include "what are the skills needed to succeed at this job?" or "what does a typical day in this job look like?" (Jeff Summers, NEADS Calgary Job Search Strategies Forum Report).

At a NEADS Job Search Strategies Forum in 2007 in London, Ontario, Terry Peach, manager of organization and staffing, GE Canada, offered some tips for young professionals going through the interview process.

> *"As soon as an applicant enters the room, employers start making assessments regarding handshake, body language, and dress—even statements that might have been made earlier, in the elevator."*
>
> *Terry Peach*

Prior to the interview, applicants should have researched the company online and made sure they know what it does and/or produces. Once the main interview starts, applicants must be clear about their skills and goals, and be ready for some tough questions. Interviewers might ask the applicant to recall, for example, how they reacted after making a specific mistake, or a situation in which they had to handle a difficult customer. On the topic of replying to questions, Peach advised applicants to frame stories about their experience using the CAR method: Context, Action and Results. Applicants should be able to explain the background to a specific example or situation (the context); what they did about it (their actions); and what the results were.

Peach described the four most common types of job interview: behavioural, situational, job function and unguided.

In a behavioural interview, the most common type, applicants will be asked to tell stories—for example, about how they handled a difficult customer who demanded a complicated service at the end of a long day, or about a significant accomplishment in a work setting.

Situational interviews ask applicants to respond to a specific hypothetical situation. Even in these cases, Peach advised that a behavioural answer is ideal—applicants should tell the interviewer what they did in a real situation that parallels the hypothetical test.

Job function interviews test actual job skills, perhaps on an engineering or accounting problem. An unguided interview might start with the general question, "Tell me a little about yourself." Almost all interviewers will ask applicants to make self-assessments, such as "what do you see as your major strengths and weaknesses?"

"Don't ever say something like: 'I work too hard'," Peach said. "The right answer is to offer some suggestions about the kinds of training that you would appreciate." (Terry Peach, London, Ontario Job Search Strategies Report)

After the interview, many suggest reconnecting with employers by telephone, thank-you letter or email. This projects an image of responsiveness, respect and professionalism (Melody Choboter, NEADS Calgary Job Search Strategies Forum Report).

Preparing for the interview and thinking about how potential employers may perceive applicants are subjects that keep many people up at night. To avoid lost sleep, it may be advisable to build a "team for success" with whom to practice interview techniques and give feedback about an individual's demeanor, self-presentation and résumé. By drawing from a circle of friends, mentors, and contacts at local organizations and career centres, job seekers can maximize their chances at dazzling employers with their interviewing skills as well as their qualifications. To read an article about success teams and other interview considerations, visit www.neads.ca/en/norc/jobpostings/jp_successteam.php

"Everyone has something special to offer, it is important to present that in the interview. That is what will get you the job."

Jeff Summers, NEADS Calgary Job Search Strategies Forum Report

Employment Opportunity Resources for Individuals with Disabilities

WORKink:

www.workink.com

WORKink's mission is to facilitate communication and provide resources and information to enhance the equitable and meaningful employment of people with disabilities.

The Canadian Council on Rehabilitation and Work:

www.ccrw.org

The Canadian Council on Rehabilitation and Work is a Canada-wide network of organizations and individuals. Their mission is to promote and support meaningful and equitable employment of people with disabilities. As innovators and agents of change, they build partnerships, develop skills, share knowledge and influence attitudes.

Link-up Employment Services:

www.linkup.ca

Link-up provides employment links to individuals with disabilities.

Programs to Help Individuals Skill Build and Assist in the Job Hunt Process

Canadian Council for Rehabilitation and Work: Partners for Workplace Inclusion Program

www.ccrw.org/en/pwip.html

Canadian Council for Rehabilitation and Work: Workplace Essential Skills Partnership

www.ccrw.org/en/wesp.html

The Workplace Essential Skills Partnership, funded by Employment Ontario, is a dynamic employment program designed specifically to provide job seekers with disabilities with a professional view of the world of work. The program gives participants the necessary tools to be competitive in today's job market and the confidence to become employed.

Canadian Council for Rehabilitation and Work: Youth the Future

www.ccrw.org/en/ytf.html

The Youth the Future program is a 20-week pre-employment skills-development program that provides youth with disabilities the pre-employment skills necessary to enter today's workforce.

The Job Find Club: PATH Employment Services

www.pathemployment.com/ClientServices/job_find.htm

This is a three-week course focusing on learning modules designed to help PATH clients develop the necessary skills for their employment goals. Facilitators continue to provide support and follow-up for clients during their job search and for three months after the Job Club ends.

Path Employment Services: PATH Enhanced Employment Services

A service plan is developed for PATH clients with their individual abilities in mind. Some clients are able and willing to conduct a great deal of their job search with PATH's guidance and leadership. Enhanced Employment Services provides assistance to persons with disabilities to find paid, competitive employment through a "one counsellor to one client" method.

"Looking for a job can truly be one of the hardest jobs you can ever have and the work you put in today can mean success tomorrow."

Melody Choboter, NEADS Calgary Job Search Strategies Forum Report

My Long Journey From School To Work

by Simon Payn, Jobpostings Magazine (Winter 2008, page 8)

Avril Rinn has some tough talk for students with disabilities who are entering the job market. Like most sound advice, it may be uncomfortable to hear – but often the harshest advice is most valuable.

Avril, who is visually impaired, has certainly earned the right to advise students. She admits she made mistakes at school, and she's learned from those mistakes. Now she wants others to learn from them too.

How Avril went from student to employee

"I went into university from high school without a clear goal. I think I was similar to a lot of kids with disabilities and I decided I wanted to be a social worker," says Avril. "I had no idea what a social worker did, but I just wanted to be one and help people with disabilities.

"I stayed in university for three years but I never finished a degree. My marks were not very good, more because I was quite directionless rather than because I wasn't academically able."

Avril did summer work at university. She found it was useful to get experience and find out what the real world was really like.

After leaving university, she spent a year doing pretty much nothing.

"One issue I had was around isolation," she says. "The more I stayed at home, the more I wanted to stay at home."

But then she received a mailing for a computer training program for people with a visual impairment, offered by an agency called ATN Access, in London, Ontario.

"I remember seeing that little envelope and thinking, 'I have to take this opportunity.'"

That course started a career-long interest in the pursuit of self-education, something she advises every disabled student do.

After Avril completed the program, ATN Access hired her — first part time and eventually to a full-time position. As the agency expanded, so did Avril's job. She started giving computer instruction and then added life skills coaching to her role. She's now the organization's computer support person and gives computer and life skills training and advice.

Have a dream and a goal

Avril says the lack of direction she experienced isn't that unusual for students with disabilities.

"It's really easy for people with disabilities who are getting a government pension not to do anything, because they are not hungry," she says. "Often their parents will be still involved in their lives. It's not that big of a deal if you don't work. Often nobody has encouraged you or helped you believe there's anything you're capable of doing.

"I think people are capable of more than they sometimes think they are and get credit for being. I know I was."

Avril firmly believes everyone should have a dream and a goal. Those goals may change, but you have to be going somewhere.

She also believes in getting as many life experiences as you can — however difficult that may seem.

"People should be prepared to take something that isn't necessarily a dream job, because it's a job for now and it will get them some experience."

Think of what skills you have (and don't have)

Avril says it's important to think about what you have to offer an employer. But also, think about things that might be missing.

"People are sometimes missing social skills," she says. "Sometimes they have gotten away with being who they are because they have a disability.

"I often find that people's issues around working are really nothing to do with the disability. It has a lot sometimes to do with attitude — whether they can be on time for things, whether they have coffee break skills. All those little, soft skills you learn by being parts of groups or by people giving you honest feedback."

Know Your assistive technology

Be aware of assistive technology, Avril advises. "If you need an assistive device or an accommodation, be really proactive about knowing where to buy it, the price of it and if there is a government program to pay for it," she says.

"The last thing your employer wants is someone who doesn't know the answers to all these questions — you won't look like a motivated person who wants a job."

Avril uses a large-print software program and has a stand that brings her computer monitor closer. She says she's arranged her environment to make it friendly for her.

Also consider if a full-time job is really what you want, or whether it's something you feel pressured into. After all, an employer will notice pretty quickly if you don't really want to be working.

"People with disabilities are sometimes living on a subsidized income — there's nothing wrong with that — and they don't need a full-time job. Maybe a full-time job isn't what you are aiming for," she says.

Consider part-time or telecommuting opportunities as an alternative to full-time work.

Final Words for Success

"You really are your own ambassador, and if you can project in the interview a confident way of dealing with your disability and not come across as bitter or unhappy, they are going to want to hire you," she says.

"How your future turns out is really up to you. If you make intelligent, realistic choices about your life, no education is ever wasted.

"People are not likely to go wrong if they do that."

Build Your Team For Success

by Simon Payn, Jobpostings Magazine (Winter 2009, page 10)

It's a wonderful time for people with disabilities, says Stephen McDonnell.

Employers are competing to find the best talent, and people are beginning to understand accommodations. But, says McDonnell, senior adviser on talent management and diversity at BMO Financial Group, it's important everyone has support in place to help them make the journey from school to work.

You can bet Avril Lavigne has a success team — people who follow her around and make sure that her hair is looking shiny and the media is kept at bay.

She's not the only one. It's a fact that behind every success is a team of people. That's a useful idea for anyone looking for a job to keep in mind — But particularly so if you have a disability.

Stephen McDonnell says every job-hunter needs to "captain their own team."

He suggests to start your graduating year by assembling a group of four or five people who will give you some honest feedback.

"The critical thing is not to invite people who are there to tell you what you want to hear," says McDonnell. "Get people who will speak to you honestly, give you real feedback and real information that will help you in your job search.

"Have someone on your team who is brave enough to say 'when is the last time you laundered your clothes?' or, 'when is the last time you cleaned your shoes or your wheelchair?'"

The ideal team, says McDonnell, might be made up of a fellow grad, an entrepreneur, someone with human resources experience and maybe someone in a university careers centre.

You can talk to your team about your plans and ideas and get some honest feedback. They can help you role play interviews — perhaps grab some sample job ads to try out and then keep practicing on a weekly or monthly schedule.

And when you get a job interview, your team can be there to make sure you have a copy of your résumé with you, to check that the batteries are charged on any adaptive technology you are taking with you, and to ensure you have phoned in advance to make sure the venue is accessible.

After the interview, you can use your team to debrief. Keep your team around after you start work, too, by including someone in your office on it. If for example, you have a seizure disorder, your team can help make sure your dignity is maintained during a seizure.

"Find people who will commit to you for up to two years to help you find a job or to maybe find out the reason you are not getting a job," says McDonnell. "And find people who will commit to you for a year after you are employed, so you can say, 'this is my first performance review, what do you think of it?'"

Find an employer that is right for you

More companies than ever have created an inclusive workplace. But not all of them are there yet. So why choose an employer that's still operating in the Dark Ages? McDonnell suggests students use their research skills to find an organization that will be a right fit. As he says: "it's nice to have a job; it's better to find a place where you can make a career."

Read employers' websites and annual reports to find out who they give money to, where their scholarships are held and what they do for philanthropy. "The litmus test I use is whether they are giving to the disabled, or do they have a scholarship program for people with disabilities," says McDonnell.

Find out if the employer understands corporate social responsibility, part of which is having a representative workforce. BMO, for example, has a statement that says: we draw our strength from the diversity of our people and our business.

"I would seriously counsel someone who did not find those kinds of statements in a firm to ask if they really want to work there, because it doesn't sound like it has a supportive environment," he says.

Call disability-specific organizations, such as the CNIB, to ask about their experience with a particular firm.

Make volunteering work for you

Volunteering is a great way to build real-life experience. But McDonnell says it's important to quantify how much volunteering you have done so you can demonstrate your activities to any employer.

"Most disabled people in some shape or form are an activist in the community or they are involved on campus doing something," he says. "So write that down like it is work experience and also quantify it.

"Write down your volunteer activities in a journal. At graduation, you can say on your résumé you have over 250 hours of work in the campus legal aid clinic, or you've done volunteer tasks for 300 hours. Employers understand what that's worth."

McDonnell also says it's important to have a reference who can talk about this volunteer work if any employer calls. "We've made hires based on that," he says.

"Stay in touch with people who can speak to who you are from a values perspective and also from a work experience perspective.

"Keep that network alive. If you're shy or an introvert, really work on that part of yourself. Force yourself to be a bit more extroverted; keep track of information about those in your network, and put a holiday card in the mail."

Advice for the interview

It's important to talk about what you can do, rather than what you can't do, at interview, says McDonnell.

"The interview must always be about your ability, your skills, your competencies and your gifts," he says.

"If an interviewer spends an hour talking about your disability, you are not going to be able to get a job there."

Disclosure

The issue of disclosure is tricky and much debated. Deciding at which point during the application, hiring, or employment process to reveal to an employer that you have a disability – if at all – is not easy. There is no one clear cut solution, but here are some issues to consider, and possible strategies that should make disclosure more comfortable for all parties involved.

First, we must recognize that disclosing for a job in a science and technology setting is somewhat different from disclosing for a position that may have more established protocols for accommodating persons with disabilities or that may be less technical. There are already many industries that have long histories of successfully employing and accommodating the needs of persons with various disabilities. These may range from unskilled labour and production jobs to skilled work in banking or government sectors.

Science and technology fields have certain industry-specific considerations and characteristics that have traditionally made it difficult for persons with disabilities to obtain jobs in these fields. The first characteristic is that by definition, many science and technology jobs are on the cutting edge of research in their specific field. As accommodations typically lag behind the capabilities of cutting-edge research and technology, it has historically been an extremely costly and almost unimaginable undertaking to accommodate a science and technology job for a person with a particular disability; the necessary accommodation either may not exist yet, or may be very cost prohibitive.

Fortunately, with national and provincial sources of job accommodation funding becoming more available in Canada, cost considerations should be less of a concern for most employers. Also, the speed at which new accessible technologies are developed is starting to approach the development curve for mainstream technology, so for many traditional technologies or pieces of equipment being developed these days, there is most likely a company – or a division of the original development company – working on an accessible workaround or model of the same piece of technology or equipment.

Another challenge particularly common to science and technology workplaces is the use of expensive, uncustomizable workstations. This is common to such workplaces as chemical or biological research facilities, where workstations may have been constructed at a time when accessible standards of workplace design weren't enforced, and adjusting them would be very costly. This trend may be seen in setups such as lab benches with water, gas, and vacuum utilities, where the controls would not be reachable by a person in a seated position. As lab designers are becoming more aware of persons with disabilities progressing through science education, they will be more sensitive to universal design. For the moment though, retrofitting older style lab benches is costly, and not always a priority.

A third consideration for science and technology jobs is the attitudes of the researchers or employers themselves. In many industries, people with disabilities encounter the attitude of, "We're not sure how to accommodate a person with a disability, so we'll just say that it's an undue burden on the company." The situation in science and technology is in some ways worse, and some ways better, than in other industries. Many employers and educators in science and technology fields begin a discussion in workplace accommodation with the thought that, "We don't need to modify our workplace, because people with disabilities don't work in science and technology jobs." On the surface, this may seem like a very negative attitude with an anti-disability agenda. However, it may be possible that science and technology employers who believe this have never encountered a

person with a disability who was qualified for or was applying for a science and technology job. The only way this stereotype can be corrected is for qualified people with disabilities to study in science and technology fields they are interested in, and upon completion of their education to get out and start applying for jobs, and be willing to disclose the fact that they are a person with a disability who needs accommodations. The fortunate thing about scientists, engineers, and other people in science and technology fields is that they're very intelligent and creative individuals. If anyone can think of a workplace accommodation that has never been thought of before, they can.

When to Disclose a Disability

The decision to disclose is a very personal one, and it will differ from person to person. There are several logical points in the job search process for a disclosure to take place. Here, we will look at some of the potential positives and negatives of each point.

The first point in the job search process at which disclosure is possible is right on the application form, résumé, or CV itself. Many job seekers wonder how effective is it to disclose at this point? In the best case scenario, you've alerted an open-minded and sensitive member of hiring staff to your situation or needs, who will then make the necessary arrangements or considerations to ensure that your application process is smooth and unbiased. In the worst case, however, you've raised several red flags among the hiring staff and the department you hope to be working for about potential costly changes and accommodations that they believe must be made in order for a disabled person to hold the position being hired for. If the interviewers are overly anxious about this prospect, they may make the interview and selection process uncomfortable, or even a waste of time, for the qualified individual who has a disability. Unfortunately, all of this anxiety will have been developed without taking the time to meet with the disabled applicant to see their level of competency or the extent of their disability. While it may seem right to be completely forthcoming and out in the open with regards to your disability, it may result in unforeseen negative consequences due to pre-existing stereotypes or misapprehensions.

The next opportunity for disclosure presents itself when the employer contacts an applicant to set up a job interview. While this is typically a short conversation, it does give the employer a first impression regarding an applicant's speech and how they present themselves over the phone. If an applicant chooses to disclose at this point, it can still go either way. The employer may be pleased or impressed by your forthcoming manner and whole-heartedly proceed with the interview, or the employer might take this opportunity to express concerns regarding accommodations to the workplace or position itself. As this is a pre-interview chat, it may be an informal setting in which to discuss these issues, or the employer may not have the time to discuss anything if they did not plan time for any additional conversation to occur during this phone call. It is also important to keep in mind that the interview itself may not be a traditional, sit-and-chat (behavioural) interview. The employer may require all applicants to take an exam, perform some job-related functions, or be interviewed by a group of people. At the very least, it would be prudent to ask what style of interview it will be, so that if accommodations need to be made they can be requested at this point. At any rate, the employer would now have more information to use in making a decision about how to proceed with the interviewing and hiring process.

If an applicant is especially concerned about how the news of their disability will be received, they may wait until later to divulge this information. The applicant may feel it appropriate to hold off with disclosure until the interview itself or, if possible, until the job has been offered to them and their work has commenced. This may seem a very empowering and reasonable way to act, so the

employer would have no chance to discriminate based on previous information. In the case of a physical or sensory disability, the condition will be noticeable most likely during the interview. If the applicant has made it that far without mention of their disability hindering their chances at getting a job, it is possible that their disability wouldn't become a factor in their ability to keep the job either; but this can be a double-edged sword. If the disability in question is something minor or intermittent (a hidden disability), and the employer is unaware of it, a situation may arise due to unforeseen circumstances that may prevent the employee from carrying out their job to the fullest. They may cite their disability as the reason, but if their employer were hereto uninformed, this could create a very awkward situation with the employee having to explain why the disability had not been mentioned sooner. This could theoretically result in sanction or loss of job if the limitation is great enough, when proper accommodations may have been made if the employee had been more up-front about their situation earlier.

To read an article describing some of the types and effects of various hidden disabilities, please check out the story from *Jobpostings* magazine found at the end of this section or at the following URL on the NEADS website: www.neads.ca/en/norc/jobpostings/jp_hidden_disabilities.php

Employer Willingness to Accommodate

In 2003, Gilbride et al conducted a series of interviews and focus groups with both disabled people who had been successfully employed and companies which currently employ workers with disabilities in both a large city and mid-sized city setting. During their study, which also included a literature review of past research into this topic, the researchers came up with three main categories of factors that could result in companies being receptive to hiring, and ultimately hiring, people with disabilities:

Work cultural issues

1. Employers include people with disabilities with all workers and treat them equally.
2. Employers welcome diversity; they are egalitarian and inclusive.
3. Employers' management style is more personal and flexible.
4. Employers focus on a worker's performance, not his or her disability.
5. Senior management expects and rewards diversity.
6. Employers are comfortable providing accommodations to all their employees.
7. The organization provides "cafeteria-style" benefits. (This is a benefit plan where employees may take advantage of certain medical or dental benefits as they wish rather than a prescribed "one plan fits all" arrangement.)

Job match

1. The employer focuses on the employee's capabilities and effectively matches the worker with the job requirements.
2. The employer obtains input from people with disabilities on their ability to perform job duties, and he or she includes people with disabilities in all accommodation discussions.
3. The employer focuses on essential, rather than marginal, functions.
4. The employer offers internships, and they often lead to jobs.

Employer Experience and Support Issues

1. The employer has the ability to supervise a diverse workforce.
2. The employer views the community rehabilitation program (or other rehabilitation agency) as a partner and as an on-going employment support resource.

The following profiles look at two professionals with disabilities who are currently employed at major technology-oriented companies, Sanjeet Singh and Neil Graham. Their stories illustrate the importance of being upfront with one's disability and taking the opportunity to advocate on one's own behalf both in education and in the workplace. A longer story on Neil Graham called "Just Enjoying Life" follows the shorter one.

Sanjeet Singh,

Software Testing Engineer, Novatel Inc.

Novatel Inc. is a leading Calgary-based manufacturer of precision GPS systems used around the world. Sanjeet Singh is employed there as a software testing engineer. He started with the company after having completed a BSc in electrical Engineering and an MSc in Geomatics Engineering at the Shulich Engineering School of the University of Calgary. Sanjeet knew that he wanted to work in a technology-related job from as far back as he can remember, despite his visual impairment. Receiving encouragement from his family and those close to him, Sanjeet was able to make his way through both of his programs at university as well as complete an internship with Nortel through his university's internship program.

There were certainly challenges along the way, however. Sanjeet first had to convince his family and the university administration that he truly wanted to study engineering and that his dedication would see him through all of the trials he would face while at school. Some of the lectures dealt with subject matter that was primarily visual, and the practical labs required more time for Sanjeet than they did students with normal vision. But he persevered and ultimately succeeded in attaining his MSc. By using the skills he developed in the classroom and as an intern, he was able to network with previous coworkers and people he had met during engineering conferences and other functions, and obtain a job in his field that he would not trade for any other.

Sanjeet recommends that students and young professionals persevere, be patient, and plan their education and career goals according to their dreams and passions.

Neil Graham, Manager, IBM

IBM is one large multinational company that is no stranger to hiring employees with disabilities. While the company demands that its employees are highly qualified, IBM understands that disabilities only limit a person as much as their own attitude and their work environment hold them back. Also, the quality of work and the accumulation of experience are not diminished by the presence of a disability in an applicant, and they deserve all of the respect and opportunities that other employees benefit from.

Neil Graham is a manager of IBM's C++ compiler division in Canada. The following *Jobpostings* magazine article chronicles the skills and qualities that allowed Neil to rise to his current position.

Just Enjoying Life

By Jessica Calleja, Jobpostings Magazine (Winter, 2006)

Neil Graham studied math at the University of Winnipeg before completing his Masters in Computer Science at the University of Toronto. Five years after being hired at IBM, his lengthy title of Manager C++ Compiler Front-End and Runtime Development sounds a lot more technical than his actual role, which finds him working more with people than computers. But Graham is not complaining. He is the company's first blind manager in its history, a position he is very proud of, yet pleasantly surprised to be in.

Back in the fall of 2000 Graham was a recent graduate working for the University of Toronto. He attended a random career fair where he introduced himself to recruiters from IBM. As he puts it, "Apparently they liked me a bit, because within three weeks I had joined the company."

He started off with IBM as a Staff Software Developer, which is primarily focused on programming and is one level above entry-level positions. His shift to management was the result of a circumstantial turn of events when he backfilled for his manager in 2004 while she went on maternity leave. It was during this time that Graham discovered how much he really enjoyed management and even though his manager has since returned, he himself has moved on to become manager of the C++ compiler team.

"Interestingly enough, given my background in math and computer science, I have really enjoyed working with people. It's great that they pay me to sit down with each of the folks who work for me for considerable periods of time every month or so. That's a lot of fun and that's definitely the thing I most enjoy about the job," he comments.

Taking an active role

Throughout his seven years in university, Graham says he encountered some challenges, but comments, "Everyone encounters at least one professor who is not entirely sympathetic whether you have a disability or not. In general, people were quite willing to let me assume the risk of taking whatever kind of study plan I wanted to take."

Throughout university, taking a proactive role with his education is what seemed to work best for Graham. He stresses that things worked better when he played the strongest role throughout the process and generally never left things up to special services to finalize. "I tried to develop direct relationships with the people producing books and with professors about tests. I found things almost always went more smoothly and timely when I took responsibility for that," he says.

When it comes down to the accommodations he needed throughout university, Graham explains that they fell into two categories, the first being of a technical nature ensuring he had all of the hardware necessary. Through the Manitoba Program for Disabled Students he was able to get refreshable Braille display, as well as a laptop computer.

The other category of accommodation was Braille books. "I was in a very technical program, so the courses I took were of a very strong mathematical nature using a lot of statistical methods. It's relatively obvious that Braille is the only sensible medium for that kind of information." For this accommodation Graham dealt with a provincially funded organization. "I was fortunate to get quite a number of the books I needed for grad work in Braille. That's about all I needed. In terms of tests and accommodations for time, I mainly took care of that myself by talking to professors directly."

Surprisingly enough, Graham says he actually needs less accommodation for his job with IBM. Contrary to popular belief, "The job of a programmer tends to involve less mathematics than the education of a programmer," he says.

"I suspect an awful lot of technical people find that in the practical world you don't tend to model things in formal methods or statistics to nearly the extent you would in a university setting. I continue to need technical accommodations for using computers, and IBM is quite good about providing whatever hardware and software I need. But I don't need the same kind of Braille hard copy material I needed in university."

Speaking from experience

When it comes to the job arena, Graham was lucky to start on with IBM so quickly after graduation. He acknowledges his good fortune and believes it is important to help others with disabilities reach their full potential. "Despite the fact we have an unemployment figure of 6.6 percent, the lowest in 30 years, there are still an awful lot of talented disabled people who have a lot to offer to the labour market. Clearly, there is a lot of work to be done. The tremendous amount of employment we have isn't rippling through to the disabled community to the extent it needs to."

His advice to students looking for a job upon graduation follows his personal mantra of assuming as much responsibility as possible. "I think sometimes people in the community tend to rely on others to find and create opportunities, and to a degree that comes from disabled folks being medicalized and marginalized. I think driving things yourself is the foundation to success in the labour market because it's likely you will exploit opportunities better. One thing employers always look for is people with a lot of initiative."

When it comes to addressing his own disability, Graham takes a realistic approach. "I think we should look at disabilities for what they are. They are characteristics that happen to involve a degree of limitation. But setting that aside, there are certainly things one has to do to be successful as someone with that kind of limitation, and these are useful experiences you can exploit in later life."

In the long run, assuming responsibility and acting as the primary catalyst in his own education helped Graham develop skills that are now useful in his role as manager. "One of the advantages of making my own role as large as possible is that it made me do a lot of work coordinating, understanding how people work and cross-teaming. I hadn't realized how much of an advantage that experience was until I became a manager. Now a lot of my job is understanding what people do and making sure different teams cooperate effectively. So there are aspects of what you have to do to be successful as a disabled person that are useful."

Throughout his seven-year academic and five-year professional career, it seems Graham has definitely made an impact. Acting as both an example and advisor he looks to the future with optimism. "I'm enjoying life at IBM. I enjoy being a manager. I certainly hope to continue down that path and gain additional responsibilities. My general career thought is to try and experience as many different things as I can. I'm enjoying my current job, but in time I'll be looking to try a different kind of role to see what that's like. Personally, I hope to keep on traveling and keep on enjoying life."

Hidden Disabilities: Out Of Sight, Not Out Of Mind

By Mark Kay, Jobpostings Magazine (Winter, 2009)

I spent over half a year sitting in the bathrooms of my university, instead of sitting in class. I had every detail of every cubicle memorized – every scribbled phone number on the walls and every crack in the plaster. Suffering through an active flare of Crohn's disease, I missed classes and overdue assignments piled up. I was in real danger of failing, but I didn't ask for help. I couldn't imagine myself saying to my professors "I have to poop a lot, please keep that in mind." I was deeply embarrassed, and that prevented me from reaching out.

Like many Canadians, I struggle with an invisible disability. Coming to terms with it, and getting accommodation for it to make my learning environment more accessible took time and confidence. There was help out there for me, but I needed to be able to reach past the stigma I felt to get it.

The first obstacle to accommodating a hidden disability is identifying it. Invisible disabilities are hard to notice and sometimes even harder to diagnose. They can take the form of learning disabilities like dyslexia or ADHD (attention deficit hyper activity disorder). They can come in the shape of clinically diagnosed depression, schizophrenia or anxiety. And they can be internal physical conditions, such as Crohn's disease or epilepsy. Because they're not immediately apparent, sufferers are accused of being lazy, or slow, or even of making things up. This perception goes a long way back: Even the Ancient Romans thought someone with epilepsy was cursed by the gods. And high schools today can be equally cruel to students whose disabilities haven't yet been diagnosed.

Lisa Lebedow, now an accounting student at Selkirk College, says when she was in high school she couldn't focus and had trouble formulating questions. Although she would later be diagnosed with ADHD, her peers, teachers and parents were all too happy to tell her she was just stupid. "I started cheating in grade six – I would drop a pencil and sneak a peek at other people's tests. I didn't know why I couldn't understand things myself," she says.

Lebedow remembers how her teachers would display the tests she failed to the rest of her class. Everyone but her would get a good laugh about how the teacher "gave me two points just for writing my name." She felt ashamed of her difficulties, and tried to avoid drawing attention to them. "I thought I was stupid."

Freesia Jamin, now an elementary school teacher, faced similar problems, and acknowledges that "elementary school to grade 12 was a struggle." While she would later be diagnosed with dyslexia and written expression disorder – a condition which makes it difficult for sufferers to write down anything they could otherwise think or say, at the time she was just called "slow." "I was told I was dumb, that this is who you are, that there are jobs at the local department store for you," Jamin says.

Formative experiences like those of Lebedow and Jamin hinder those who need accommodations from asking for them, says Michael Bach, director of diversity at KPMG – a Canadian affiliate of KPMG International, providing audit, tax and advisory services. "People don't want to admit something is wrong with them," says Bach, who himself was diagnosed with Seasonal Affective Disorder (SAD) – a condition triggered by the shift in available light over the seasons which causes chemical reactions leading to depression. "People thought I was just a depressed little kid," he says. "When I was growing up, if you had a mental disability, it meant you were lazy."

The good news is Bach, Jamin and Lebedow have all been able to obtain the accommodations they need. At Selkirk College, Jamin and Lebedow connected with their disabilities services offices, which advocated on their behalf to extend deadlines for tests or assignments. They also helped secure funding for equipment like electronic dictionaries that read and spell words aloud and arranged for note taking and reader services. Referrals and information for counselling and medical services were also provided. Most importantly, they taught the skills and confidence students need to obtain accommodation at school and in the workplace.

"It opens up your entire world when you know you're not dumb," says Jamin. "To know that I can do whatever I want, that it might take a bit longer, but I can do it in the end." Jamin went from struggling in high school to graduating from teacher's college with a 4.0 grade point average.

"I'm quite proud I can tell people that this is how I learn," says Lebedow, who is currently in the second year of her program and getting As and Bs on her assignments while also helping her fellow students with their course work.

As for the career prospects of people with disabilities, Bach believes workplaces are becoming increasingly willing to provide accommodation to those who ask for it. Companies that recognize the untapped pool of talent among Canada's disabled population often have strategies in place to help them. KPMG provides read-aloud software for employees with dyslexia and understands that employees with SAD, like Bach, will sometimes need to work from home. All that's required is that employees "have the courage to stand up and say 'I have a disability and I live differently,'" says Bach. He acknowledges there are still companies that aren't so enlightened, and employees even within KPMG who are still afraid to draw attention to themselves. But he asks: "If a company won't hire you because you have a disability, would you want to work there anyway?"

As for me, I did eventually find my way to my university's disability centre. With time, I did start telling my professors "Yeah, I pretty much have to poop a lot, here's the help I need from you." I was given extra time for assignments and exams and even dietary consideration at events. I went on to get my degree in journalism. I'm a reporter at the magazine you're holding in your hands right now. This story is all mine, but that's not very surprising. Look at Julius Caesar, who was one of those poor cursed Romans with epilepsy. He's one of history's greatest generals.

Mentorship

Once you've determined the best way to find a job, decided to disclose or not, and seek appropriate workplace accommodations, the next step is ensuring you're able to transition effectively into the workforce.

A mentorship opportunity can be an excellent way to jumpstart a new career or to make a transition between very different jobs as seamless as possible. In a typical organized workplace mentorship program, new hires or young professionals in a given field are partnered up with trusted professionals who already have a good deal of experience, and who wish to make that experience available to colleagues who may want some assistance finding their footing and learning the ropes. Mentorships can have other benefits beyond the initial transfer of knowledge, however. Simply by getting this initial boost, new professionals may feel more confident in their own abilities, resulting in increased productivity or efficiency as the new employee will already have been made somewhat familiar about workplace policies and procedures. Also, the mentor can easily serve as a connection to the greater professional community. By establishing this connection, younger staff members may find a more rapid integration into the social structure and hierarchy of a new organization, institution, or company. In short, there are many benefits to taking advantage of a mentorship program in the field you wish to work in.

This section will describe the features to look for in a prospective mentorship program and direct you to resources for mentorship programs in science and technology fields that are currently available throughout Canada.

First, it is important to understand exactly what kind of professional relationship you are getting into when taking part in a mentorship program. Typically, mentors are experienced individuals who are volunteering to support and guide younger professionals with little experience, so that they can adjust to new working conditions or quickly learn how to effectively perform in their new role. Mentorship programs will most likely involve one-on-one contact with a mentor, so they can answer any specific questions their mentees may have and offer any advice they may feel appropriate for the mentee. Depending on the program, a mentor may have several different mentees or only one, and the actual time allotted to a particular mentee may range from several weekly meetings to short monthly meetings depending on how much mentoring the mentee needs.

It is important to value the time spent with a mentor and to appreciate any assistance they can give. While a mentor is there to guide and support a mentee, it is important not to take advantage of this situation by making unreasonable requests or demands to the mentor. This includes requests such as asking that the mentor meet the mentee outside of work time to discuss work-related issues if that is not part of the mentorship program, or asking that the mentor show the mentee how certain tasks should be done by completing them themselves. This may be seen as taking advantage of another's good will, and can potentially turn into an abusive work relationship. It would also be inappropriate for a mentee to try to convert this work relationship into a more familiar work friendship if this isn't desirable to the mentor. The mentee must also keep in mind that as beneficial and reassuring as the mentee-mentor relationship may be, it must eventually come to an end, and to not feel discouraged or abandoned because of it. It simply means that the mentor or employer believes that the former mentee has achieved the goals set out by the mentorship program organizers, and is therefore viewed as a somewhat experienced professional rather than a professional in training.

After deciding to seek out or take part in a mentorship program, there are several factors to consider when choosing an appropriate one. First of all, the program should screen both mentors and mentees before any introductions are made. Mentors must be screened to ensure that they completely understand the vision and goals of the program, so the program organizers can be certain that a potential mentor won't introduce any toxic or harmful elements into the relationship. Mentees must be screened to ensure that they are aware of what the program is offering, and to make sure that potential mentees are indeed in need of mentoring. Too many incoming mentees may overwhelm the program's resources, and if all some young professionals require is a little reassurance, they may not need to take part in the full program. An adequate level of screening can keep a program both manageable and productive.

It is also important to remember that good mentors don't just grow on trees. After the screening of potential mentors is complete, it is important to then give them some training or instruction about the vision of the mentorship program itself, what exactly is expected of mentors, and how to deal with the responsibilities of a mentor-mentee relationship. When looking for a mentorship program to take part in, a prospective mentee should then try to find one that has such a training element, so that the mentor they end up with can be as helpful and effective as possible. While almost any mentoring is good mentoring, a quality, well-trained mentor can help a new hire to go a long way in any organization.

Finally, a prospective mentee should become informed on the program's policies regarding termination and evaluation. How long should the program last, ideally? What are the reasons it may end prematurely? Where should he or she go if the mentorship isn't providing what they feel is necessary? All of these questions should be thought about and answered before entering into any mentorship arrangement, so that all parties involved know where they are standing. If the program does come to a conclusion without incident, as it ideally should, the mentee also should be able to offer feedback about how they were treated during the program, what aspects they enjoyed or felt were beneficial, and what aspects they felt could use some improvement. In the same way that learning is all but impossible without feedback, mentorship programs will not effectively change and grow over time without input from the mentees they serve. It is the mentee's responsibility to evaluate the program and make their feelings known, so that future mentees can gain as much benefit as possible.

Now that we have taken a brief look into the qualities of a mentorship program and the factors to consider while deciding if a particular mentorship program is right for you, let's look at some of the mentorship programs in Science and Technology related fields that are available across Canada. This list will be updated over time, so please check back occasionally and refer it to any other young Canadian professionals you may know who are seeking mentorship and employment opportunities in science and technology fields. Many of the programs listed here are not specifically directed towards people with disabilities, but state in their promotional material that they are actively looking for people who belong to equitable employment groups, and people with disabilities is one of these.

Entrepreneurs with Disabilities Program for Western Canada

Residents of western Canada who are disabled due to physical or mental impairment, restricted in their ability to perform at least one of the basic activities of entrepreneurship or self-employment, are a new or current small business owner with a viable business plan, and who have previously been unsuccessful in obtaining other business funding may be eligible to receive business information, training, mentorship, and one on one counseling for the purposes of business development. Loans can also be obtained for people who have failed to obtain funding from other sources with flexible terms tailored to individual needs.

www.wd.gc.ca/eng/273.asp

The Biotechnology Initiative

The Biotechnology Initiative, which has been committed to connecting and growing professionals in the biotechnology industry since 1989, started its mentorship program in 2009. The not-for-profit industry association represents Ontario's pharmaceutical and biotechnology industry. TBI promotes life sciences technologies and encourages their commercial success in Ontario through Government advocacy, stakeholder engagement, mentoring and education and promotion of Ontario's world class science and industry. With over 300 members, TBI supports a wide range of sectors: academic and research institutions; government; companies from the biopharmaceutical industry, agriculture biotechnology sector, agricultural/ petrol bioproducts, medical devices, biopharmaceuticals, pharmaceutical multinationals, contract research/manufacturing, financial, legal, human resources and consultants.

www.ontbi.org

Okanagan Business Mentorship Network

This program was started by the Okanagan Science and Technology Council in 2006, to give entrepreneurs in the Okanagan region of B.C. support and funding for business ventures in the fields of technology and agriculture. It is funded by Western Economic Diversification Canada. For additional information, contact: Mike Winterburn, Director of Communications, Office of the Minister of National Revenue and Minister of Western Economic Diversification, Tel: (613) 995-2960.

Environment Canada's Science Horizons Youth Internship Program

This program offers promising young scientists and post-secondary graduates hands-on experience, through work on environmental projects under the mentorship and coaching of experienced scientists and program managers.

www.ec.gc.ca/sci_hor

MentorNet

MentorNet is an email-based mentorship program run by Canada's Association of Information Technology Professionals. It isn't widely publicized online, but the program managers have said that they would welcome participation from the disabled community.

GE Foundation Scholar-Leaders Program

The GE Foundation Scholar-Leaders Program in Canada is a unique program that provides financial support and skills development opportunities to 15 accomplished first-year undergraduate students from recognized institutions each year, who are pursuing degrees in the fields of engineering and business/management and are a member of one of the following groups: Aboriginal peoples, persons with disabilities, women in engineering programs.

The program is funded by the GE Foundation, the philanthropic organization of the General Electric Company, and is administered by the Institute of International Education (IIE) on behalf of the Foundation.

The program provides:

- A $4000 per year scholarship for the 2nd, 3rd, and 4th years of your undergraduate program;
- An opportunity to be mentored by a business leader at GE in Canada; and
- Participation in GE Foundation Scholar-Leaders activities, including a specially designed leadership development seminar at GE Canada in Mississauga, Ontario;
- Participation in community development projects.

Order of Canada Mentorship Program

While this program isn't strictly focused on science and technology, it is a great opportunity offered through the Office of the Governor General of Canada, and it is open to students from all sectors of interest. It, and other, similar government initiatives can be found at: www.citizenvoices.gg.ca/en/themes/mentorship

(The following text was obtained from an article at: www.news.gc.ca/web/article-eng.do?m=/index&nid=4733)

Her Excellency the Right Honourable Michaëlle Jean, Governor General of Canada, would like to invite dynamic youth to apply to the Order of Canada Mentorship Program. The Order of Canada Mentorship Program pairs 25 members of the Order of Canada with 25 young Canadians aged 18 to 25 for one year. The goal is to promote discussions between people who share the same interests and passions, and who want to help develop their communities. The mentor-participant pairs will first meet in person in the presence of the Governor General. After that, mentoring and discussions will take place online and by email.

The program allows for productive discussions to take place and friendships to form. Created in 1967, the Order of Canada is the masterpiece of Canada´s honours system and recognizes a lifetime of outstanding achievement, dedication to the community and service to the nation. The Order recognizes people in all sectors of Canadian society. Their contributions are varied, yet they have all enriched the lives of others and made a difference to this country. For more information about the Order of Canada and its members, please visit www.citizenvoices.gg.ca/en/themes/mentorship

The Order of Canada Mentorship program was created in 2008. It pairs 25 young Canadians with 25 members of the Order of Canada. The mentors and the young people they counsel will be invited to post blogs and take part in discussions forums on the www.citizenvoices.gg.ca website. Eligible candidates must be between the ages of 18 and 25. Participants will be selected by an independent committee based on their involvement in their community or area of interest, and the quality of their answers to the essay questions on the application form.

The Future of Science and Technology

As the fields of science and technology become more accommodating to people with disabilities, it is up to qualified people with disabilities to contribute to the development of the sciences. Scientists with disabilities need to step up and show the scientific community that the resources, research time, hours of study, and funding that have been spent on adaptive technology and Universal Design have been worthwhile.

One way in which scientists with disabilities can contribute to their chosen field is to take the plunge into the lengthy and challenging process of earning a Ph.D. The research that is contributed to their field's body of knowledge will expand the frontiers of science. Also, the education of young scientists in the classroom, and of the general public and policy makers outside the classroom, will highlight the benefits of making accommodations for scientists with disabilities. By publicly contributing back to the sciences, the accommodations that have previously been made to the trailblazers of scientists with disabilities will have been justified, the impetus for future accommodations will be even greater, and a more representative population of scientists will be created with all of the diversity and perspective that comes along with it.

The following are profiles of five academics with disabilities who were successfully accommodated during their education and careers, and whose educations or experiences are today enabling them to make major contributions to their fields of research.

Dr. Andrew Cuddihy

Dr. Andrew Cuddihy is currently a junior faculty member and research scientist at the University of California Los Angeles, where he does research involving stem cells. Before obtaining this position, he did four years of post doctoral work in Melbourne, Australia, and two in Toronto. Before this, he obtained a B.Sc in Biochemistry from Queen's University and a PhD in Cancer Research from McGill University.

Andrew went deaf at the age of four, but he was integrated into regular-stream classrooms from the beginning of his education. As a result of his post-lingual deafness, he has excellent lip reading and language skills, and so has always been able to function well even in somewhat unaccommodating environments.

He realized his passion for science and scientific research in high school, and immediately began to fill his schedule with as many math and science courses as possible. The encouragement he received from his family, friends, and educators was universal, and Andrew has always been more than happy to let his CV and the quality of his publications speak for him.

The challenges he encountered throughout his education were purely physical, and mainly centred around the difficulty of reading a professor's lips in a large lecture theatre or while the professor was turned away. Initially, he attempted to make it through university without any accommodations, but after some frustration, he decided to make use of in-class note takers. This arrangement wasn't ideal, as many note takers' personal interpretations of a professor's words can be almost unintelligible. Eventually, Andrew worked with the Queen's University Office for Students with Disabilities to develop a piece of software called C-Note, which allows two-way communication in class between a note taker and a deaf student. When this arrangement had been worked out, Andrew was able to make it through his undergraduate and doctorate programs with much less difficulty.

His advice to students is to take advantage of every available accommodation. Education is a costly endeavour, and you should do everything you can to shift the odds of doing well in your favour. He also advises students to network as much as possible with people in their fields, to ensure having contacts and being able to find employment down the road. "Let your merits and academic accomplishments speak for themselves," advises Andrew. "You may be a student or researcher with a disability, but the disability isn't what you're trying to advertise."

Andrew hopes to work for a biotech or pharmaceutical company at some point in his career, but so far he has found that industry somewhat more challenging to break into than academia.

Dr. Linda Campbell

Dr. Linda Campbell is an assistant professor at Queen's University. She conducts research on environmental contaminants, runs an analytical laboratory, and works with graduate students and postdoctoral fellows on their research programs. She also teaches several courses in environmental studies and biology, and participates in committee work and outreach.

She graduated from the University of Alberta with a BSc in Zoology and MSc in Biological Sciences. She then went to the University of Waterloo for a PhD in Biology. Her thesis was on environmental mercury in eastern African lakes, and she spent three field seasons in Uganda, Kenya and Tanzania collaborating with African scientists. Prior to graduation, Linda was awarded an NSERC post-doctoral fellowship, which she used to undertake a two-year position with Environment Canada in Burlington, Ont., doing research on contaminants in the Canadian Great Lakes basin.

At university, Linda had always felt drawn to aquatic research and took courses accordingly, in addition to standard, required science courses. She faced barriers in finding an adequate amount of funding to hire ASL interpreters to accommodate her deafness. However, thanks to scholarships as well as government funding, Linda was able to hire an interpreter during both her time on campus and while doing field work all over the world.

As for advocacy, Linda feels that nobody knows their own needs better than themselves. It is important to be able to take the initiative to make your needs known, and to give those providing services feedback so those needs can be better met. On the other hand, it is also important to recognize advocates who can support or assist you along the way, and to make use of them as much as you can. Constantly advocating for the entirety of your career as a student and beyond is a difficult task, but thankfully, you don't have to go it alone.

Linda has the following advice regarding pursuing education and building a career, "Be willing to think laterally. The path that works for most people may just not be your route to success – you may have to consider alternative approaches and solutions. But that is not to say that you will not be successful! To overcome barriers set in place by people's attitudes, it is important to try to understand what is behind people's responses, identify your true obstacles and work on generating positive good will and collaborative approaches to resolving those obstacles."

Dr. Kathryn Woodcock

Dr. Kathryn Woodcock is an associate professor at Toronto's Ryerson University, teaching, researching, and consulting in the area of human factors and ergonomics. Her research interests include the application of human factors to occupational and public safety issues of performance, error, investigation and inspection, and to disability and accessibility.

She also heads the THRILL lab, researching and developing applications of human factors/ ergonomics to amusement ride safety (www.ryerson.ca/thrill), as well as supervising graduate students in the Mechanical Engineering Graduate Program (MEGP).

Before joining Ryerson, she managed a research and policy unit in the Prevention Division of the Workplace Safety & Insurance Board of Ontario. Through the 1980s, she was a hospital vice-president and active in the Ontario health care sector. Kathryn previously taught graduate and undergraduate courses in industrial engineering and ergonomics at Rochester Institute of Technology (New York) and the University of Waterloo, and is an adjunct scientist of the Institute for Work and Health.

Kathryn is a registered Professional Engineer and Canadian Certified Professional Ergonomist with degrees from University of Waterloo and University of Toronto, a member of national and international professional societies in ergonomics, and has presented many papers in the field. She is also active in the community, as a member of the Consumer Advisory Council and Amusement Devices Advisory Council of the Technical Standards and Safety Authority, and Deaf Women in Science and Engineering. She served the Ontario Minister of Community and Social Services to the Accessibility Standards Advisory Council, challenged to implement the Access to Ontarians with Disabilities Act (2005) from 2005 to 2009.

Kathryn never had any career plans outside of the sciences, and describes her inclination in that direction as a "default setting." Throughout her education in engineering, she experienced more negativity and barriers of attitude due to her being a woman, rather than due to her deafness. It is only by persevering and holding herself up to the highest standards that she was able to make it through her program just like any other engineering student.

Now that she is a professor and researcher, Kathryn still has difficulties finding funding for paid interpreters, which many people seem to not grasp the need for. Also, the inconvenience of needing to use students as go-betweens for ordering lab supplies and other administrative tasks is frustrating, but not nearly enough to force her to call it quits.

To students pursuing a career in the sciences, Kathryn has the following advice. “Do it. There will be those who try to protect you from disappointment and the certain failure that will happen when someone tries something hard. Accept that the harder the challenge, the more likely you will experience failure. Failure is educational. It teaches us that next time, we should work harder, or try a different strategy. If you never fail, you are not challenging yourself enough, but at the same time, it’s not ‘okay’ to fail. Failure is like spending money. If you fail, you better be getting good learning value to make the investment worthwhile.”

She follows this up by saying that when it comes to advocacy, it is important to remind those you interact with of your needs. Don’t let their assumptions interfere with your education or goals. Also, don’t be afraid to circumvent barriers rather than tear them down completely. Advocacy is extremely important, but sometimes we need to make time for other things like building a career.

Dr. Mahadeo Sukhai

Dr. Mahadeo Sukhai is an accomplished scientist working in Toronto. He is also a member of the NEADS executive. The following is a transcript of an interview we conducted with him for this guide.

Q: Tell us a little bit about yourself? What schooling have you taken? What do you currently do? Where and how have you tried to find a job?

A: I am visually impaired; I was born with congenital cataracts. I started my post-secondary studies at the University of Toronto in 1994, and obtained my Honours B.Sc. in genetics in 1998, my M.Sc. in pharmaceutical sciences in 2001, and my Ph.D. in medical biophysics in 2007. I currently am working as a post-doctoral Fellow in translational leukemia research at Princess Margaret Hospital in Toronto. Although this is still technically part of my research training, it is a full-time research job.

Over the years, I've held jobs in teaching and research – either at the University of Toronto or in private tutoring. Most jobs that I have applied for have been associated in one way or another with my training and qualifications as a scientist and educator.

Q: When you realized that you wanted to pursue a career in science and technology, did you begin to alter your course load to improve your chances of future employment? How exactly?

A: I first realized that I wanted to be a scientist when I was very young. I think the inspiration struck me when I was about six years old. I originally wanted to be an astronomer, but ended up in human genetics and molecular biology during my undergraduate degree. I never considered chances of future employment while I was pursuing my education – and so, this question does not apply to me.

Q: Did you receive any encouragement or discouragement from friends, family, community members, or school officials about your course choices?

A: I was always encouraged by my parents to pursue my dreams – there was not one word, in this context, at least, of how unfeasible or unrealistic they might have been. I think if I had heard that at home, my path would have been much more difficult that it already was. In many respects, I was blessed with family and friends who encouraged and supported my objectives; I encountered resistance from some educators at various levels, but, while I found it to be unusual, I was not overly concerned by it. As long as they didn't actively interfere with my learning, I was unconcerned as to whether they thought I belonged there or not.

I recall one particular incident, which on the face of it certainly could have been classified as discouraging: My very first genetics lab, in my very first class, I disclosed to the course coordinator – this was in my third year of undergraduate studies – that I was visually impaired and born blind. Her comment, "Wow, you're the first blind geneticist I've ever heard of," actually served as inspiration and encouragement in the long run. I'm sure she didn't intend it in any way other than a statement of her knowledge – no discouragement was intended, and probably not any encouragement either. But, often, it's not what people think about what they say that matters – it's how we choose to interpret it. This comment, I took positively, and let it carry me to the end of my first degree, and beyond.

Q: Were there any physical or social barriers to obtaining the education necessary to pursue a career in science and technology? If so, how did you overcome them?

A: Social barriers, sure – I mentioned educator perceptions already. Sight is the most important of all senses to any human being; most cannot understand or stand to imagine what life without sight is like. And people rely on sight for so much. So, the perception of "You can't see, therefore, you won't make a good scientist" was a very strong thing in the minds of some of my teachers and professors. Some articulated it. Most – fortunately – did not. I had enough good experiences as a student to drive out any negativity in that regard.

Things got more complicated in graduate school – here, it was very important to ensure that my supervisors especially understood what I could do and what I was capable of. Again, fortunately, I was blessed with the chance to work with great people who understood that lack of sight did not equate to lack of ability or intelligence, and who, as a consequence, gave me the chance to excel and show my true potential.

Physical, financial and technological barriers, if anything, played a greater role in my education – these issues centered around finding the appropriate technological and visual aids for me, particularly in graduate school, and then ensuring that they could be paid for. Fortunately, again, and in particular for my graduate degrees, the University of Toronto was both very understanding and very accommodating – and, more to the point, very creative in helping me achieve the set of accommodations I required for my education. I learned that flexibility, communication and partnership were critical to my then and future success.

Q: What's your current position?

A: I am a Post-Doctoral Fellow in translational leukemia research at Princess Margaret Hospital. My career trajectory leads me toward an academic appointment in a few years' time.

More philosophically, the "soft" skills (personal management, team management, teaching, oral and written communication, time management, organizational, project management, leadership, etc.) that I developed directly and indirectly through my undergraduate and graduate education will give me the ability to do anything I could possibly want to do in the future, even if it is not directly related to science or technology. I am already applying those skills in the not-for-profit sector and in governance, as part of my volunteer activities outside of work.

Q: What advice would you give students with disabilities wishing to pursue a degree or career in science or technology?

A: Lots of people will tell you lots of things about what you can and cannot do. You might even believe some of them. However, If you believe you will like a career in science and technology, if you believe that this will bring you fulfillment and will support you financially, let no one

and nothing get in your way. There will be obstacles – people, technology, finances, resources, beliefs, attitudes. And there are days when you will want to quit. But, for us as people with disabilities, this is a particular kind of glass ceiling. Ultimately, we are the best judges of our own abilities – I don't guarantee an easy road, but I can guarantee the fulfillment that comes from knowing that you're doing something you really and truly want to do.

Q: How would you describe your experience in getting to where you are today?

A: Incredibly rewarding. Very hard. And those are two sides of the same coin. This profile doesn't let me get into the detail that I would ordinarily get into about the benefits of volunteerism, and how best to learn about your skill set and abilities and interests – but, I will say this: Despite everything, despite all the days when I wanted to chuck the whole concept of a career in science, no matter how hard the road seemed, no matter how many obstacles got in the way, I would not trade my experience in getting where I am today for anything. I really quite enjoy all that I do, and I wouldn't have gotten here without the challenges I faced or the encouragement I received. And I wouldn't give any of that up, or exchange it, for anything.

Q: How did you advocate in order to get where you are today in the field of science and technology (or did you have to advocate)?

A: Of course I had to advocate. I had to advocate on two fronts – first, to convince people that I had the raw ability and talent to do what it was I wanted to do; and second, to gain the technology and resources I needed in order to do it. The first, unfortunately, is something we can never really escape from. These days, I let my CV do the talking, but even so, there will always be those who don't understand, or those who will question, or those who will make assumptions about the way things are supposed to be, and if you don't fit that mould, they won't lift a finger to provide you encouragement or assistance. With these people, one either ignores them and goes around, or one goes straight through and lets one's actions do the advocacy. As the saying goes, "Actions speak louder than words." Or, as one colleague of mine neatly put it, "You don't need your eyes in order to think."

The second kind of advocacy is much more in line with what people are accustomed to – but, interestingly, I always approached it as a negotiation. I found that bringing legal obligations into things tended to hurt my chances of getting something. People usually knew what the right thing to do was, it was just a matter of negotiating how best to get it. This approach, I found, got me further in life than any other.

Q: Did any mentors/key players assist you throughout your science or technology degree or the start of your career?

A: Yes. I owe the greatest debt in this regard to my PhD supervisor, but my current post-doctoral mentor and several colleagues and collaborators over the years have been incredible role models and wonderful people, and great mentors over the past decade. I couldn't have done this without their insight and contribution.

I was also blessed to have several very good friends who shared my educational background, and who served as peer mentors for me. I found this kind of mentorship invaluable in my development as well.

Q: How did you find the job search experience? Were the employers encouraging and accommodating? Did you find your first science and technology job through the newspaper, internet, job search forum, networking, or other?

A: Extremely complicated. Some of that is actually due to the vagaries of the field I'm in, and what is currently accepted as "standard" in that field – that is, that a Post-Doctoral Fellow should go out and "see the world" to gain other kinds of research experience than that which he or she is accustomed to. This usually means uprooting oneself to go live in another city, another country, even another continent. Given the logistical difficulties associated with my accommodation set, this is rather more challenging than moving house. Sadly, I've discovered that not everyone understands these particular issues.

Scientists, for all their vaunted idealism, are often very closed-minded and unsure what to do with things outside their expertise. I've seen this several times in my job searches – I had one person who I wanted to teach for say to me "How can you see to teach?" Good question – I told him to hire me and find out.

I have never used a job search forum or the newspaper or the internet to find a job in my field – that's simply not how it's done. Informal networking is more the norm, and that's what it's time to start doing in earnest.

Dr. Gregor Wolbring

Dr. Gregor Wolbring is a prominent academic, biochemist, bioethicist, health policy researcher, ability scholar and assistant professor in the University of Calgary Faculty of Medicine. Here is the text of an interview we conducted with him for this guide.

Q: Can you tell me a little bit about yourself? What kind of schooling have you taken? Tell me a little bit about what you do for a living?

A: Since 2008, I have been an assistant professor at the University of Calgary, Faculty of Medicine, Department of Community Health Sciences, Program in Community Rehabilitation and Disability Studies (www.crds.org). Most of my work is concerned with science and technology governance and its impact on, for example, marginalized populations. But I am also a biochemist, a bioethicist, a health policy researcher and an ability scholar.

Q: What drew you to these fields?

A: I wanted to be a biochemist since I was fourteen. I figure at that age that I would not be accepted as a physician (being a wheelchair user) if I study medicine, so I decided to do the next best thing, biochemistry, and to become a researcher in the university.

Q: What courses do you teach?

A: I teach courses on social implications of ethical theories, global health and new technologies, introduction to disability studies, introduction to community rehabilitation, and a course on innovation. I teach at both the undergraduate and graduate level.

Q: What kind of schooling, and what types of courses, did you need to get to where you are today?

A: I did normal high school. I did my biochemistry degree at the University of Tubingen in Germany and diploma work in Tubingen and the University College London, UK. I did my PhD at the Max Plank Institute for Biophysics in Frankfurt. Then I went as a post-doc in 1992 to the University of Calgary Faculty of Medicine.

Q: What kind of disability do you identify as having?

A: None. Well again, you have to differentiate what you mean by disability. You are thinking of disability in terms of impairment, and I don't – I have no legs, but I don't see that as an impairment, but rather as a variation.

Q: That's a very good point. Can you speak a little bit more to that?

A: Well, I am very particular about language, and I think there is a problem that we use the term "disability" for two different discourses. One is a body image discourse, and one is for the social treatment discourse. Normally when people use the term "disability", they mean to identify a body structure or function that is labelled as an impairment in relation to expected body structures and ability functioning. I do not identify my body with this use of the term. I might have no legs, but I do not see this as leading to a mobility impairment, but a mobility variation. However if "disability" is used with the second meaning that highlights the social discrimination one experiences due to one's non-mainstream body structure/functioning, I see myself of course as disabled as many places are still inaccessible for wheelchair users.

Q: Okay, I agree. What would be a better way of framing that?

A: Well, I am just a person without legs. But I would not put any judgement on it, on what that means. It's just a variation. However I obviously experience disablement within society; that's a social reality within the social structure, in issues of accommodations and so on.

Q: During your undergraduate and graduate studies, did you face any discrimination?

A: Sure, mostly building-wise, where there were not a lot of accommodations. You just had to accommodate yourself, which I could do. I am one of the lucky guys. I can use a wheelchair, I can use legs (prosthetics).There are always tools. And I love to crawl.

Q: What kinds of things did you do to advocate for those accommodations?

A: I didn't. There was no time for that. If you want to make a career, you don't have time to try to get people to change things, because you will miss so much time. There is no time to sue... you just suck it up and do things. And I was in a lucky position that I could do things, modify myself with all these different tools.

Q: Did you ever receive any encouragement or discouragement from friends, family members, or community members when you disclosed that you wanted to enter into the science and technology fields?

A: My parents said, "Do whatever you want." And my friends and people around me were never discouraging me. I was very lucky in this way.

Q: So it was pretty supportive?

A: Yeah, of course.

Q: What advice would you give other students about accommodations within the classroom?

A: I wouldn't know. I am still the only one, to my knowledge, in Germany who went with a wheelchair, without legs, through a bichemistry degree. I never met any others.

Q: You were the only one in the entire class?

A: Oh yeah, the only one in the entire degree. There were no others.

Q: Why do you think that is?

A: Well, because if you are not able to modify yourself [it can become a problem]. I could use the legs (prosthetics), because the wheelchairs were not allowed in the labs in Germany or the UK. So I was only able to do it because I could use my artificial legs in order to deal with the lab. I think if you have to use a wheelchair it is for the most part impossible to go through a degree that involves lab work (in many countries). I would assume that the buildings are still inaccessible in many places and still have problems with wheelchairs. I can't see that there are buckets of wheelchair biochemists around. And it's pretty different from country to country,

from faculty to faculty, even universities. Within different universities you have different access, willingness between different faculties, different demands on accessibilities, different problems of inaccessibility. So it's not really something you can generalize. The good or the bad, it's so different from faculty to faculty. Even within a given university it's different.

Q: So those are the more physical barriers. Did you run into any social barriers when you were trying to obtain your education? Did you face any discrimination from colleagues, professors, etc.?

A: No.

Q: So it was primarily the physical limitations within the classrooms?

A: Yeah, I mean, as long as you perform and get your results what more can they say? I mean, they were shocked obviously when I showed up for the orientation and they had never had anything like me, and I never asked before whether I should do it. I know that I qualified. They didn't know beforehand.

Q: Okay, so then you show up. What was that like? What was their reaction like?

A: Obviously kind of, "what is he doing here?" But it changed fast. I figured it's the same thing here, right? People make associations. When I am wheeling through the faculty of medicine, people think of me as a patient. Typical assumptions.

Q: So how would you describe your experience in getting to where you are today, as a biochemist and a professor?

A: Well, I think it's as it is with everyone. You have to work hard. It's not like you are going to get any slack. You have to work hard. You have to perform, and you have to get your results. If you don't, then you don't make it.

Q: Is there any piece of advice that you wish you had when you were a student going through this process?

A: Well I think, first, don't take any rejection personally. Second, perseverance. And just work hard. As I switch between different tools, in this way I am in a much better position than most people. I find ways of doing things. But not everyone of course can do it like I did. So everyone has to find their own solutions. And again, it depends on where you go, different faculties, different departments will have totally different willingness to adapt things. And even if they do want to adapt they often have trouble with administration; even if professors who run a biochemistry research lab want to adapt the lab, they very likely have no money to do so. No one is really paying for making a research lab accessible in many countries.

Q: There is no government funding?

A: No, not for modifying research laboratories. So therefore, if a professor wants to hire you, it's really on to you. You get along with how the lab is set up but they can't remodel the whole lab, because they don't have the money for this.

Q: In your opinion, does it fall upon students' shoulders to cover a lot of the accommodation costs?

A: Well, if you really want accommodation then you would have to [pay for it yourself]. But it's so expensive that you would not be able to afford it. Remodeling a whole lab would cost $50,000 – $100,000.

Q: What is the perception in academia? Is the perception that it is the student's responsibility to accommodate, or the institution's?

A: First, one has to differentiate between being a student and accessing learning labs, and being a graduate student or a post-doc where one works in a research lab. And the issue of adaptation is really problematic for individual research labs. Grants are for research material and salaries, for example, hiring a graduate student. The research grants do have not accessibility construction parts in them. When I get a disabled student to hire from grants, the money is already spoken for for salary, and not for making the lab accessible. There are no available grants to modify the lab in most countries, I think.

Q: What advice would you give those students who might not be able to navigate around the actual physical setting?

A: I would say you have to change your expectations. You have to know what you will face. You can complain all you want but, as unfair as it is, you still have to perform. Because later on you may have gotten the degree, but you are so old that no one will hire you anymore. So you have to be aware of the barriers that exist in different settings in different universities, in different faculties, in different departments. So, you should be realistic with what you will face. Even if you think that everything needs to be adapted for you, what you want and what you get are a whole different story. And I don't think it does any good to come in with the mentality that they have to adapt everything, knowing that you won't get everything. That might be good for activism, but it doesn't do you any good for your career as a biochemist. If activism leads to changes, you can do more things; indeed disabled people can do now more in university than they could do 40 years ago. But the ones who fought for it very likely did not directly benefit. You don't have the time to wait to win a lawsuit before you actually change things. I do a lot of disability activism so disabled people have it easier, but for myself I simply had to adapt. It never occurred to me that I couldn't do what I wanted to do. But I am in a position where I can adapt myself. If people are not able to do so, then they have to do more research and they have to be much more realistic of what they can do and what kind of adaptations, accommodations you get, within a given system. Buildings do not change fast.

Q: When you graduated with your PhD, how did you find the job search?

A: I never searched. I went from one person to the next one I knew.

Q: The doors were open when you finished your PhD?

A: Well, because I knew people. And I made arrangements. If I had applied by letter, I think it would have been more difficult, simply because most people would not be able to judge my suitability and the suitability of their labs. And many, of course, have prejudice against disabled people.

Q: So networking was incredibly important?

A: Yeah, of course. That's why you have to be good and people have to know you in the field. So blind applying for me just didn't work. People have to know you and your work and that your work is high caliber. It's easier.

Q: Were there any key players or mentors that helped you through your science and technology degrees?

A: No. I just knew what I wanted and I did it.

Q: Now where you are in your career, are there any physical or social barriers?

A: I do not think there are social barriers nowadays for me. I am too well-known in the different areas I work in. Sure, physical barriers I still encounter in Calgary and every time I travel. There are so many places that are not accessible. And when they build new stuff, it's still often not accessible. So that hasn't changed. They do everything that is required by code, and again, I don't have time to debate, if they want to do it like that. I try to circumvent. I do most of my teaching online so I don't have to bother with buildings and other accessibility issues. [Attitudes are] different between faculties. They behave completely different. So that's why I say, there is no homogeneous evil and homogeneous good. It really changes from faculty to faculty about how much they even think about and how they build accessibility-wise. For example, in washrooms they often do not think about buttons. They think about the bigger stalls, but they don't think about buttons for the entrance door to the washrooms. They have heavy hinges, which means I have to speed with the wheelchair to be able to push the door to the washroom open. And I am not willing to speed, as I do not see who is on the other side and feel unsafe. So I label such washrooms as inaccessible and often do not use them, or I crawl in. People don't internalize universal design needs for different people. That's just the reality.

Q: What do you think would need to happen for people to internalize these issues?

A: Unless they all had no legs they wouldn't know. Even within our own movement it's a reality. People in wheelchairs often don't think about what the blind person needs, or the deaf person needs, or the developmental different person needs. We don't train ourselves to look at a building from all different subgroups. So I think our movement is just as bad. It's not just the so-called able-bodied people who don't internalize the view of what the less-abled can do, all movements are the same thing. Very few go through life seeing every single angle. It's human nature. People have to teach themselves to be more cross-disciplinary, more diverse in how they see the world. And we don't train people like that. We specialize people, in the fields they cover, in how they see the world. For example, many who think about a disabled person do not necessarily think about the problems indigenous people face. We have very few who would think holistically about things from many angles. It's simply a generic problem with the human species.

Q: Do you have anything else that you think is important for students with disabilities within the science and technology fields?

A: Never take anything personal. If people treat you badly, it's not because of you, it's because they are bad or ignorant or stupid people. They just don't get it and they will do the same to others. If someone treats you badly because they are a bully, they will also bully other people. So never take it personal. Because then you just become bitter and then you are cutting into your enjoyment of life.

Q: How did you manage to cope with that?

A: My parents gave me this message: "You follow your dreams and don't take anything personal. Focus on the good people." Therefore, I was very prepared. My parents are wonderful, what can I say. You just have to step back and not take things too personally. All the time I say that my wheelchair is a pretty good pre-screening tool. People who can't cope with me won't treat me as an equal in the wheelchair, so people who can see beyond the wheelchair are normally less prejudiced, and I rarely face problems related to who I am with people who get to know me more.

You focus on the people who treat you nicely. Stay loyal to those who are good and just ignore the others. You can't do anything about them anyway. I do a lot of activism work, but you can never take it as a personal thing. You do it for the group, especially if you have certain

abilities that the group doesn't have, you can add to the capacity. But if you do it as a personal vendetta, then you are just hurting yourself. I think that, because I made it in the system, I have an obligation to do stuff for those who did not make it into the system, or who are to come. I benefited from others who wanted to help make a difference, so I think I have an obligation to help others. We often have a problem with those who make it into the system who disengage from the movement. And I absolutely do not agree with that. If you make it into the system, great, but you should think of ways to give back to your community. There are enough people who did not make it into the system and need help, and I think that if you make it into the system you have an obligation to give back.

List of Resources

The following are links to organizations that can provide general information related to the success of persons with disabilities in education and the workplace.

Government of Canada: Persons with Disabilities Online	www.pwd-online.ca
The Centre for an Accessible Society (American)	www.accessiblesociety.org
American Chemical Society, Chemists with Disabilities	https://communities.acs.org/groups/chemists-with-disabilities-we-all-can
National Educational Association of Disabled Students (NEADS)	www.neads.ca
NEADS reports	www.neads.ca/en/about/reports/
NEADS Job Search Strategies Forums videos	www.neads.ca/en/norc/videos/employment.php
NEADS Online Work System (NOWS)	www.nows.ca
Jobpostings Magazine articles, hosted on the NEADS website	www.neads.ca/en/norc/jobpostings/
Workforce Recruitment Program	www.wrp.gov
AccessStem	www.washington.edu/doit/Stem/

The following are links to organizations that can provide information on accommodations and assistive technology that can be used in post-secondary education and in the workplace.

Job Accommodation Network	www.jan.wvu.edu/links/employ.htm
Ability Links	www.abilitylinks.org
Canadian Assistive Devices Industry	www.at-links.gc.ca/AS/zx22000E.asp?t=4
Adaptech Research Network	www.adaptech.org

The following are links to human rights bodies across Canada, which can provide information on your rights as a person with a disability both in academia and the workplace.

Canadian Human Rights Comission	www.chrc-ccdp.ca
Ontario Human Rights Comission	www.ohrc.on.ca
Human Rights Tribunal of Ontario	www.hrto.ca
Human Rights Legal Support Comission	www.hrlsc.on.ca
Alberta Human Rights and Citizenship Commission	www.albertahumanrights.ab.ca
British Columbia Human Rights Tribunal	www.bchrt.bc.ca
Manitoba Human Rights Commission	www.gov.mb.ca/hrc

New Brunswick Human Rights Commission	www.gnb.ca/hrc-cdp
Newfoundland Human Rights Commission	www.justice.gov.nl.ca/hrc
Northwest Territories Human Rights Commission	www.nwthumanrights.ca
Nova Scotia Human Rights Commission	www.gov.ns.ca/humanrights
Prince Edward Island Human Rights Commission	www.gov.pe.ca/humanrights
Québec – Commission des droits de la personne et des droits de la jeunesse	www.cdpdj.qc.ca/en/home.asp
Saskatchewan Human Rights Commission	www.shrc.gov.sk.ca
Yukon Human Rights Commission	www.yhrc.yk.ca

The following are links to organizations that offer resources related to employment skills, job searching, and/or mentorship programs.

WORKink	www.workink.com
The Canadian Council on Rehabilitation and Work	www.ccrw.org
Canadian Council for Rehabilitation and Work: Partners for Workplace Inclusion Program	www.ccrw.org/en/pwip.html
Canadian Council for Rehabilitation and Work: Workplace Essential Skills Partnership	www.ccrw.org/en/wesp.html
Canadian Council for Rehabilitation and Work: Youth the Future	www.ccrw.org/en/ytf.html
Link-up Employment Services	www.linkup.ca
Path Employment Services	www.pathemployment.com
Entrepreneurs with Disabilities Program for Western Canada	www.wd.gc.ca/eng/273.asp
The Biotechnology Initiative Mentorship Program	www.ontbi.org
Okanagan Business Mentorship Network	www.wd-deo.gc.ca/eng/77_3293.asp
Environment Canada's Science Horizons Youth Internship Program	www.ec.gc.ca/sci_hor
GE Foundation Scholar-Leaders Program	www.scholarshipandmore.org
Order of Canada Mentorship Program	www.citizenvoices.gg.ca/en/themes/mentorship

The following resources link to organizations or other bodies who help to fund workplace, and in some cases education, accommodations across the country.

Canada-wide Opportunities Fund	www.hrsdc.gc.ca/eng/disability_issues/funding_programs/opportunities_fund
British Columbia Employment Program for Persons with Disabilities	www.eia.gov.bc.ca/pwd/eppd.htm
WorkAble Solutions. Recruiting and Retaining Persons with Disabilities	www.eia.gov.bc.ca/epwd/initiative.htm
Alberta Disability Related Employment Support	www.employment.alberta.ca/CES/3159.html
Saskatchewan Employability Assistance for Persons with Disabilities	www.aeel.gov.sk.ca/eapd
**Manitoba doesn't seem to have specific funding for accomodations of employment sites for employers. The closest thing is section 144 of the provincial manual for the Family Services and Housing Department. It outlines funding availability and requirements for education and vocational training. www.gov.mb.ca/fs/vrmanual/144.html	
Ontario Disability Support Program	www.mcss.gov.on.ca/mcss/english/pillars/social/odsp
ODSP Employment Supports	www.mcss.gov.on.ca/mcss/english/pillars/social/odsp/employment_supports
Quebec Governmental Support	www.emploiquebec.net/individus/handicap/index_en.asp
New Brunswick Training and Employment Support Services	www.app.infoaa.7700.gnb.ca/gnb/Pub/EServices/ListServiceDetails.asp?ServiceID1=17056&ReportType1=All
Nova Scotia Diversity Accomodation Fund	www.gov.ns.ca/psc/v2/employeeCentre/diverseWorkforce/accommodationFund.asp
Prince Edward Island Disability Support Program	www.gov.pe.ca/hss/peidsp
Newfoundland Independent Living Resource Centre	www.ilrc.nf.ca/nldisabilityorgs.htm
While this organization doesn't have a central fund for supplying employers with money to accommodate employees with disabilities, they do provide a list of organizations for various disabilities, each of which may have their own funding sources.	
Yukon Territory	www.hss.gov.yk.ca/programs/social_services/disabilities
This website provides a list of resources, though there is nothing specific to funding for employing persons with disabilities.	
Active Living Alliance North West Territories	www.ala.ca/Content/Prov-Terr/NWT/NWTHomePage.asp