CAS and CASCON Honouring 25 Years of IBM Research and Innovation

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Forward

The Centre for Advanced Studies (CAS) was established in 1990 at the IBM Toronto Software Laboratory. The primary aim of CAS is to facilitate the transfer of research ideas into the products and services in IBM. The first CASCON was held in November 1991 at IBM Toronto Lab. In 2006, the CAS model for research collaboration was recognized by NSERC with the 2006 Leo Derikx Synergy Award for Innovation awarded to IBM and 12 university partners. In recognition of the 25th Anniversary of CAS and CASCON, we solicited short chapters for a book to document and highlight the importance and influence of CAS within IBM, academia, and Canada.

We invited people from the CAS ecosystem to write chapters that articulate the various ways in which CAS and CASCON have impacted their collaborative research, innovation, and technology exchange over the past 25 years. We were looking for submissions from different perspectives that highlighted and documented individual experiences with CAS and CASCON as well as for descriptions of mechanisms, research results, technology transfers/exchanges, influential results, and HQP training for which CAS and CASCON are so famous.

The response was enthusiastic and the result is 28 high-quality chapters written by 33 past and current CAS Research Staff Members, CAS Directors, IBM Executives, IBM Developers, CAS Students, CAS Faculty Members, and industry collaborators. Through the chapters in this book, readers can trace the history of CAS and read stories of early CASCON experiences and large-scale CAS projects. The breadth of perspectives in this book articulates the full scope and influence of CAS and CASCON, describing significant research resulting from CAS collaborations and documenting the impact of CAS and CASCON on individuals and institutions. The personal accounts pay tribute to the significant and lasting effect of CAS and demonstrate a passion for an organization that is rare and extraordinary. There are stories of friendships and relationships that have been built and sustained over the past 25 years—because of CAS. There are descriptions of significant innovations and influential outcomes that resulted from CAS projects. There are also suggestions for the way forward and mechanisms for measuring future CAS success.

We set out to document the influence and impact of CAS and CASCON. This book does that and much more. Through these chapters, the authors have illustrated how this one organization initiated within IBM Canada has changed the IBM research and development landscape, the Canadian computer science and software engineering communities, the Canadian software industry, and the lives of the people in this amazing CAS ecosystem.

We would like to thank every single person who contributed to the great success story of CAS and CASCON over the past 25 years. We especially would like to thank all the authors of this volume who shared their very personal experiences for this wonderful tribute to research and innovation at IBM CAS Canada.
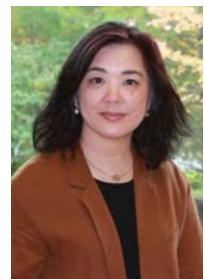
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All I Really Need to Know (About Work), I Learned in CAS

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ABSTRACT
I am in the enviable position of having held almost every possible role in CAS during my career. I started as a CAS Fellowship student in 1991 and became a CAS Research Staff Member when I graduated with my Ph.D. in 1994.   In 1999, I held a development manager role and worked as the development contact for CAS researchers before serving as the CAS Director from 2004 to 2007. When I transitioned to academia, I was named a CAS Faculty Fellow. My time in CAS starting in 1991 prepared me well for all aspects of my career. In this chapter, I identify the ways in which being part of CAS taught me everything I need to know about work.   In describing what I learned and how, I demonstrate the lasting impact and influence CAS has had on numerous students, faculty members, and IBM developers just like me.

Keywords
CAS, lessons, future career.

1. INTRODUCTION
There is a well-known book by Robert Fulghum entitled, "All I Really Need to Know I Learned in Kindergarten" [3]. Some of the key things that Fulghum identifies include sharing, being kind to one another, cleaning up after oneself, and balancing work, play, and learning. I argue that, while kindergarten may prepare one well for life, it is participation in CAS that prepares one well for work and a fulfilling career. The original CAS mission was, "to become a world-class applied research centre that facilitates the transfer of advanced research into strategic products." [11]. In the late 1990s, the CAS mission became: to facilitate the exchange of academic research knowledge and real world industry challenges towards enhancing IBM products, processes and services. This mission is achieved through three goals:

- Establish IBM as the partner and employer of choice for top students as they learn and develop skills to create the technology of the future

- Build and foster relationships among researchers, funding agencies, IBM and customers

- Expose IBM developers to current research directions, and identify new and emerging technology issues for academic research

Students in CAS develop skills and expertise in working with industry people, positioning research in real-world contexts, and

building and maintaining relationships. CAS Research Staff Members learn how to lead projects and must understand how different groups and people are motivated in order to work across academic and industry boundaries. IBM developers and development managers learn how to conduct research and apply research findings within products. Academic researchers who serve as CAS Faculty Fellows learn about the challenging problems facing IBM and its customers while developing an understanding of the pressures associated with delivering products on a schedule. CAS Directors are given the opportunity to set a vision and objectives for an important organization and mobilize resources, build relationships, and develop programs to achieve that vision. I feel very privileged to have learned and gained experience in all of these areas. In this chapter, I highlight a few specific examples of important lessons from my time in CAS that have helped me in my career.

2. WHAT I LEARNED IN CAS
My early experiences in CAS greatly influenced and shaped my future career and my values. Of the many lessons I learned in CAS, I have selected a few that I still practise today.

2.1 Articulate a vision and make decisions in line with that vision
As CAS students in the early 1990s, we were given responsibilities in the organization of CASCON. Looking back at that time, I realize now that, implicitly, we were implementing our tasks in line with the mission and vision of CAS and CASCON. At the time, I had not yet been explicitly taught how to articulate a mission and work with the mission and goals in mind.

Soon after I was hired (by Jacob Slonim, then Head of CAS) as a Research Staff Member (RSM) in 1994, Jacob asked me to travel to Montreal and Ottawa to meet with faculty members and determine which projects we should pursue in CAS. I was concerned that my limited experience would make it difficult for me to make decisions and so I enquired as to how I would know what to do when I was there. He told me that as long I understood the basic principles of what we were trying to do in CAS and made decisions in line with those principles, I would do the right thing. This was the first time I was explicitly told that I should consider my mission or principles and make decisions accordingly.

I was able to put this CAS lesson to the ultimate test when I became the Head of CAS in 2004. I met with the then IBM Toronto Lab Director, Hershel Harris, and he told me that I had been given a great opportunity to run an organization like CAS. It meant that I would be able to take the CAS mission and goals and make use of the resources available to me to achieve the mission and goals. I was immediately taken back to the lesson

Jacob Slonim had imparted on me ten years earlier. I understood the importance of having a goal in mind but also the satisfaction it brings to know why you are doing what you are doing and the ability to prioritize based on a well-defined, explicit mission or set of principles.

This important lesson has stayed with me. In work and life, I strive to make my principles and mission explicit and then make decisions with my goals in mind. I also teach this to my students. In each course and in my capacity as an advisor, I ask students to reflect on their own specific learning outcomes and goals and remind them to reflect on their objectives when making choices throughout the course or in their careers.

2.2 Build and Sustain Relationships

Inherently, I always knew that people and relationships were important (in fact, this is something we learn in kindergarten: "Without realizing it, we fill important places in each other's lives. … Good people who are always 'there,' who can be relied upon in small, important ways. People who teach us, bless us, encourage us, support us, uplift us in the dailiness of life." [3]). However, it wasn't until I was a CAS student that I experienced the ways in which strengths of relationships have an impact on the quality of work outcomes.

As a CAS student, I was a member of the Consortium for Research in Distributed Systems (CORDS) which was focused on the development, operation, and management of distributed applications [10]. During the summer of 1992, several CAS students worked together on the sixth floor of 895 Don Mills Road in one of the IBM Toronto Lab buildings. At the start of summer, Jacob charged us with building a prototype to develop a sample distributed application. We came from different backgrounds in computer science and our individual thesis research was extremely varied yet we worked together to develop a single prototype by adding mechanisms to the existing CORDS middleware, and integrating our own specific research into the prototype system. Through this process which was a difficult task, we became friends, socializing together and supporting each other in our individual research challenges. We dubbed our project, Operation Jumpstart, and not only produced a solid prototype but wrote and published a paper reporting on the project and the results [1]. The relationships we built during that summer enabled us to create something of value together. Furthermore, my interactions with fellow graduate students in CAS taught me that assembling a team of graduate students to work together on a shared goal enriches student research and relationship experiences and also enables research outcomes on a significant scale.

This book itself is an example of how strong relationships built over years in CAS can make great things happen. Everyone is busy with their own work commitments, yet when the editors of this book invited people to submit chapters, many people jumped at the chance. We want to create things together because of a strong mutual respect and desire to help one another.

The strength of relationships can often help when making difficult decisions. One of the unfortunate themes of my time as the Head of CAS was the reality of cost cuts. One year, the CAS team looked at all of our programs in light of our mission, goals, and available resources. We identified several ways in which we could best accomplish our goals while dealing with a decrease in financial resources. Building on the strong relationships we had with the CAS Visiting Scientists, I spoke with a group of key individuals (an ad-hoc advisory committee of sorts) and asked for their input and guidance. In the end, we decided to reduce the funding to the Visiting Scientist program, a decision that would have been very difficult to make and communicate without the strong relationships we had nurtured over the years.

2.3 Articulate Value

When I was the Head of CAS, I mistakenly expressed to a marketing person that CAS so was wonderful, we didn't need to market it. It turns out that I was wrong and he was correct when he told me that excellent services and products need to be marketed as much as or more than weak ones. Until then, I resisted quantifying the value of CAS and even posted a sign on my cubicle door at 8200 Warden Ave. that said, "Not everything that counts can be counted; not everything that can be counted counts." There were two times when I was the Head of CAS that we worked to formally articulate the value of CAS: when writing our nomination for the Leo Derikx NSERC Synergy Award for Innovation; and, when I was asked to justify the value of CAS to a new vice president after an IBM reorganization.

Both times, the CAS team worked together, bringing in others as needed to gather information, analyze data, reflect on past activities, and identify creative ways to articulate CAS value. This work brought the team together and we felt even prouder to work in such an incredible organization. We all intuitively understood the tremendous value of CAS but our exercise in quantifying and making that value explicit was an extremely satisfying and pride-inducing activity.

2.4 Honour and Document History

This book, assembled as a way to recognize 25 years of CAS is an example of a way in which we can honour and document our history. The CAS Model was celebrated in two issues of the IBM Systems Journal: Vol. 33, No. 3 in 1994 and Vol. 36, No. 4 in 1997. Each issue presents one article documenting the CAS model itself along with several articles reporting on key CAS projects and results. These documents are examples of how we can preserve the legacy of organizations such as CAS.

In 2005, under the leadership of Hausi Müller, CAS celebrated the pioneers of computing in Canada [8]. Honourees were selected using the following criteria: having spent a substantial part of their career at a Canadian University, contributing significantly to computing science education and research, and having received a PhD degree in 1972 or earlier. In total, 92 pioneers were honoured at a gala dinner held at CASCON in 2005. There was also a panel presentation in which pioneers reminisced about the past and made predictions about the future. For all of the pioneers, we documented their major achievements, memorable experiences, and words of wisdom[1]. Figure 1 shows a picture of the pioneers who were able to attend the gala dinner and dance event at CASCON 2005.

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[1] Pioneers of Computing 2005: Honouring those who Influenced the History of Computing in Canada
http://individual.utoronto.ca/klyons/files/pioneers.pdf

Figure 1: Canadian Pioneers of Computing honoured at CASCON in 2005

In 2010, we celebrated the 20th anniversary of CAS and CASCON. This milestone was marked in several ways including proceedings featuring fifteen past papers in a CASCON First Decade High Impact Papers proceedings [7] and a "vintage demos" showcase. Figure 2 shows me with friend and colleague, Wendy Powley, demonstrating our 1992-1994 graph layout demo called "GLAD". We were not able to compile our code from nearly a decade earlier but we were able to present screen shots and display some of the vintage CASCON bags from the early years.

It is possible to find ways to use research tools to help document the past. Inspired by the 20th anniversary of the CAS conference (CASCON) in 2010, my then doctoral student, Zack Hayat and I used Social Network Analysis (SNA) to characterize interactions in CAS by analysing co-authorship data over 19 years of CASCON (a total of 657 papers and 1101 authors) [5]. SNA provides a structural view of the CASCON co-authorship network as well as analysis of individual actors (authors) and their place in the network. Our analysis indicates that, in the CASCON community, social capital is maintained by the connections (cohesion) that exist among its members. While the average structural holes ratio in the CASCON community has decreased over 19 years, the cohesion of the network has increased.

Figure 2: Kelly Lyons and Wendy Powley pose beside their "Vintage Demo" celebrating 20 years of CASCON in 2010

Looking back, I have missed some opportunities to honour and document important events throughout my career. Putting these events and related artifacts together takes a great deal of time and effort but the lasting effects are priceless.

2.5 Have Fun and Make Friends

During my time at CAS I made lifelong friendships. This is partly because we worked together but also because we socialized together. Since my days as a CAS student, the CAS community has played soccer together, often ending up at someone's house (usually mine) to eat and share stories of the games.

One of the CAS traditions was an annual picnic where students, faculty members, CAS researchers and staff, and IBM developers took a day together for food and games. During my time as Head of CAS, budget constraints and new policies limited our ability to buy food for non-IBM employees, but we continued the tradition by making the CAS picnic a potluck affair.

The CAS team had favourite restaurants such as the Armenian Kitchen and Noodle Delight near the Don Mills Lab and Milestones near 8200 Warden Avenue. Each year, CASCON brings many old friends together again and the social events around CASCON are as important as the technical sessions.

I believe that one of the reasons that strong friendships are built through CAS is because we all believe so strongly in the benefit and value of CAS. We are united in our passion for the organization that is CAS. When the CAS partnerships won the Leo Derikx category of the NSERC Synergy Awards for Innovation in 2006, the awards ceremony was in Winnipeg. Several Chairs of Computer Science Departments travelled with me to Winnipeg, each finding their own funds and taking time out of their busy schedules to be there to celebrate together. We wanted to be together, to celebrate together winning an award for an organization that we all knew was so deserving.

Figure 3 shows the smiling faces of the group that travelled to Winnipeg that year (left to right: Pat Martin, Queen's University; Jacob Slonim, then Dalhousie University; Larry Achtemichuk, IBM Toronto Lab Director at the time CAS was founded, retired; Hausi Müller, University of Victoria; Kelly Lyons, then Head of CAS; Mike Bauer, University of Western Ontario; Garth Issett, IBM Canada; Johnny Wong, University of Waterloo; and, Craig Boutilier, University of Toronto). I have remained close friends with many of the individuals in this photo. We felt tremendous pride that day as we shared stories of CAS and the significant benefit that it has brought to IBM, universities, and Canada. Our friendship was strengthened through our mutual appreciation for the CAS model.

The friendships I made in CAS continue to this day. The CAS experience taught me the importance of building friendships with work colleagues. As a result, since joining academia, I have built new friendships with my colleagues at the University of Toronto. We find opportunities to go out together, enjoy potluck lunches, and identify common interests.

Figure 3: At the NSERC Awards Ceremony in Winnipeg, Manitoba after winning the NSERC Synergy Award, Leo Derikx Category for Innovation

3. CONCLUSION

Being part of CAS was a tremendous learning opportunity for me and others. In fact, the programs in CAS were specifically designed to provide those learning opportunities to the CAS community. In addition to the important lessons described above, my participation in CAS enabled me to remain connected to academia, setting the stage for an eventual career as a faculty member at the University of Toronto. I was able to learn about and contribute to a wide range of computer science research topics including: computational geometry and graph layout algorithms [6], distributed platforms and multimedia services [14], database management systems [2], distance learning systems [13], privacy systems [12], and service oriented computing [4]. Through CAS, I grew in a breadth of areas which gave me significant background and experience in methodologies, theories, knowledge, and application areas for my current interdisciplinary research focus in service science. And I'm just one of many; CAS has contributed to many people's careers.

4. ACKNOWLEDGMENTS

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