

# RESTRUCTURING THE ACADEMY:

CURRENT REALITIES AND PREFERRED DIRECTIONS

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**OCUFA**

Ontario Confederation of University Faculty Associations  
Union des Associations des Professeurs des Universités de l'Ontario

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# Forward

In January 2007, the Ontario Confederation of University Faculty Associations (OCUFA) hosted a conference entitled “Restructuring the Academy: Current Realities and Preferred Directions” as part of its biennial conference series.

The conference was designed to reflect on the changing nature of academic work, the trends that underpin those changes, and the implications for faculty, students, and higher education in general. It brought together researchers from universities across Canada and the United States, who shared both their research findings and a variety of perspectives. The presentations and the discussions that followed provided an opportunity to contemplate preferred directions for the future in order to ensure quality and equity in our universities.

Panel discussions were organized around three themes: academic work and the faculty complement; academic work and equity; and academic work and research. Two keynotes addresses considered the past, present, and future of academic work and set the context for the panel presentations.

The proceedings of the conference contained in this collection do not include every presentation that was given. Not all panelists were able to expand their presentations into articles. Nonetheless, the articles contained in these proceedings provide an indication of the breadth of research and insight that characterized the conference.

Three of the articles contained here have also been published in the April 2007 issue of *Academic Matters: The Journal of Higher Education*. Due to space limitations, not all of the conference proceedings' articles could be simultaneously published in *Academic Matters*.

The first section of these proceedings, “The Past, Present and Future of Academic Work,” features articles based on the keynote addresses by Glen Jones and Martin Finkelstein. Jones reviews five of the critical trends underlying the restructuring of academia in Canada since the Second World War: the rise of disciplines, the massification of higher education, faculty unionization, the introduction of new technology, and the market-driven ethos of

the university. He then outlines the challenges for faculty which these trends pose and underscores the need for much greater research on higher education in Canada, particularly regarding faculty and staff.

Martin Finkelstein examines the dramatic growth in part-time and contingent faculty and the contraction of tenured appointments in North America. He argues that this restructured academy is not a temporary phenomenon but the first stage in the reconfiguration of academic work tied to the demands of the knowledge-based economy. He concludes by offering basic principles to guide faculty in responding to these developments.

The second section of the proceedings, “Academic Work and Equity,” investigates issues related to the representation and experience of women and faculty of colour in Canadian universities. Deborah Sussman and Lahouaria Yssaad analyze the changing profile of women teaching full-time in academia between 1990 and 2004. They note that the representation of women has not been uniform across all ranks of academic appointment and field of instruction. They also look at the gender differences in the academic credentials, age structure, and earnings of academics and conclude that the anticipated large-scale retirement of mostly male faculty coupled with the marked increase in women with Ph.D.s create favourable prospects for women at all levels of academia.

Edith Samuel details the realities faced by South Asian faculty in Canadian universities. She observes, based on her empirical research, that South Asian faculty have been excluded and marginalized from academia as “definers, producers, and conduits of knowledge.” Her analysis concludes with a consideration of the initiatives needed to create a supportive work environment for visible minority faculty.

The final section of the proceedings,

“Academic Work and Research,” explores the changing nature of university research as governments, the private sector and universities themselves place greater emphasis on applied research, commercialization, technology transfer and economic spinoffs. Sam Trosow delves into the complexities of intellectual property ownership in academia and the challenges posed by university-private sector research partnerships, new technologies, and distance education. He notes that “the days are over when it could be taken for granted that one was protected by the rules governing the creation, ownership, distribution and use of intellectual goods.” He then outlines the realities faculty encounter when confronting the daunting universe of patent and copyright laws.

Janet Atkinson-Grosjean considers the implications of the semi-privatization of research. She is particularly concerned about government eagerness to fund Big Science, those vast and expensive projects, such as the genome inquiry, that promise large economic returns. If the new, semi-private granting agencies are beyond both academic and public accountability, she asks, what is the fate of basic research? And what is the fate of its cornerstone, the university's commitment to academic freedom that allows—indeed *encourages*—free-ranging intellectual inquiry?

All the articles in this collection highlight the obstacles and opportunities confronting faculty as their university world changes. These articles also underscore that change is now a constant in academia. How those challenges are met will continue to provide an opportunity for further research and reflection.

# Section One

The Past, Present and Future of Academic Work

## The academy as a work in progress

Glen A. Jones, Professor of Higher Education at the Ontario Institute for Studies in Education of the University of Toronto.

There have been dramatic changes in the nature of academic work because of certain pressures and trends that emerged in the last century. Together they present some very difficult challenges for academic work in the twenty-first century. They are not the only factors in play, but they are significant. They have shaped — and continue to shape — a new academic world for faculty and universities to navigate.

### The rise of the disciplines

The academic disciplines became powerful forces in the evolution of higher education during the twentieth century. The disciplines organized themselves into societies, and the societies organized the conferences and published the journals that would come to play a central role in determining the standards of academic research.

The importance of the disciplines became even greater with the emergence of the department as the primary organizational unit in the modern university. Departments were organized by discipline, so it became the historians who worked together to determine what history courses would be offered, just as it was the broader community of historians who decided what works of history would be published in peer-reviewed journals or emerge from the scholarly presses. In many respects academic work and identity became defined by the disciplines.

With the growth of new knowledge, the boundaries of the disciplines shifted and subunits emerged. Academic work became increasingly specialized, and the academic job market became an extremely complex matching exercise. More importantly, with the growth in knowledge and specialization in academic work, the professor of physics might have a closer professional relationship with a peer specialist in Germany than with the departmental colleague in the office next door.

By the mid-1960s economist and University of California President Clark Kerr was writing about the “multiversity,” a loose

collection of specialized units held together by a benevolent central administration and common concerns over parking. The professor of physics could now spend her entire professional life working in the physics building and sharing research findings with other peer specialists at major conferences. Other than through committee meetings, the physics professors might never meet the historians, economists, and chemists working elsewhere on campus.

Twenty years later Tony Becher, in his classic book, *Academic Tribes and Territories*, was pointing out that there were dramatic differences by discipline in terms of how academic work was understood. More recent research in this area suggests that there are differences by discipline in career patterns, definitions of research productivity, publication practices, and even assumptions about teaching and learning.

The disciplines are also innately conservative, and there has been marked resistance to certain types of change within the academy. New areas of research, such as the focus on gender in the social sciences, have not always been immediately accepted by those who play key roles in patrolling the boundaries of the discipline. Academic work that strays outside of the traditional territories or employs new methodological approaches may be regarded with suspicion by the discipline peers who control the societies and journals that have come to play such a central role within the professoriate.

### Massification

The expansion in enrolment in Canadian universities following the Second World War was the beginning of a complex series of changes in the role and function of higher education that J. A. Corry, the former principal of McGill, referred to as the shift in higher education from “private domain to public utility.” Canada’s small network of universities received little public support or attention until federal government policies opened the doors of higher education to the veterans, and then

later provided the support to keep the doors open for a new generation of Canadians.

The role of universities in society evolved during what Martin Trow, the distinguished American scholar of education policy, called the “transition from elite to mass higher education.” Massification had an enormous impact on the nature of academic work. There were more students to teach and a need for more professors to teach them, though teaching loads generally increased as classrooms were filled to capacity. Mass higher education also led to changes in how universities were understood by the communities in which they were situated. Higher education was increasingly viewed as a right, and if universities were viewed as components of the broader public sector, then professors were part of the broader public service. It was as members of this category that professors enjoyed the “Rae Days” of Ontario and the “Filmon Fridays” of Manitoba.

The expansion of higher education systems led to an increase in institutional diversity and differentiation. During the 1960s the Canadian provinces created new forms of post-secondary colleges that were designed to be distinct from the provincially-supported universities. Academic work became differentiated by sector: college faculty focused on teaching, while academic work within the university sector included teaching, research, and service.

In the highly diverse American higher education system there is a stratification of institutions that relates directly to the balance of expectations within academic work. Academic work became increasingly differentiated according to the institution where the work took place. Faculty in U.S. community colleges, for example, generally have higher teaching loads than faculty in comprehensive state universities. Research plays a much greater role in the academic work of professors in research universities than in four-year institutions.

Massification also led to a division of labour within the academy, especially as governments expected participation rates in high-

er education to grow without increasing operating grants. As a result, the number of part-time contract faculty increased. At some institutions a parallel stream of teaching-only faculty was appointed. Contract positions also emerged on the research side of the equation, with the employment of both full- and part-time technicians and specialized research staff. The academic work of a department was now being accomplished by individuals with radically different employment contracts.

Institutional growth frequently also resulted in the creation of new specialized professional positions. Professors still provided students with program advice, but students might be more frequently directed towards specialized academic advisors and counselors.

Like a handful of other Western countries, Canada has moved well beyond mass, and is now approaching universal, higher education. We continue to expand enrolment, and Canadian participation rates are, once again, on the rise.

### **The introduction of new technologies**

Academic work has always been heavily affected by technology. The ways in which research is defined and understood have been influenced by advances in technology, including the rise of big science following the Second World War and the introduction of the handheld electronic calculator in the 1960s.

New communications and information technologies have changed academic work, just as they have transformed other forms of work and social interaction. The introduction of these technologies has had a dramatic impact on the organization of work within the university. The large cadre of support staff who oversaw the cumbersome manual process of student registration has been replaced by computer systems and a handful of skilled professionals with highly specialized skills. Professors type their own manuscripts. Academic librarians have revolutionized the how, what, and where of accessing knowledge.

The impact of new information and communication technologies on universities has already been the subject of a number of excellent articles in *Academic Matters* (see the Winter issue of 2006), but there are two particular issues that are directly relevant here. The first is the ways in which new technologies have affected the relationship between faculty and the university as a physical space. For faculty in some fields, the new technologies mean that academic work can take place anytime and anywhere, while for faculty in other fields technological advances have served to increase their

dependency on the physical and technological facilities of the university.

The second is the ways in which new technologies have altered the relationship between faculty and students. Electronic communication has changed the ways students and faculty interact. A new, technology-savvy generation of students has high expectations of being able to contact faculty anytime, anywhere. The combination of new communication technologies, increasing student expectations, and increasing student-faculty ratios help intensify academic work.

### **Unionization**

The global recession of the early 1970s forced Canada's federal and provincial governments to apply the breaks to what had been a speeding train of operating and capital expansion during the 1960s. Given that faculty salaries were by far the largest area of university expenditure, tensions between the university administration and the faculty association leadership on some campuses was exacerbated by the new realities of double-digit inflation and more modest government grants. Within a decade, the majority of Canadian university faculty were unionized.

Michiel Horn, in his *Academic Freedom in Canada: A History*, reminds us that decisions about tenure and promotion at many universities were left largely to the discretion of university administrators until formal procedures were adopted through collective bargaining. Even at institutions where faculty did not unionize, it became common for faculty associations and administrations to enter into voluntary agreements that protected academic freedom and specified the procedures for appointments, tenure, and promotion.

While collective agreements seldom defined academic work beyond references to teaching, research, and service, they established who was inside (and who was outside) of the faculty union, and these contracts established the procedures and criteria that would guide almost all the major personnel decisions for the professorial ranks. The agreements established the conditions of employment for a specific category of academic workers.

These collective agreements also specified the role of academic administrators in key faculty personnel issues. The responsibilities of the department chairs and deans in tenure and promotion decisions are described. These agreements usually position the chair as a faculty colleague, who is a member of the union, while the dean is frequently positioned as a manager, who is outside the association.

Collective agreements play a major role in structuring academic work and defining administrative relationships.

Unionization did not end with the certification of full-time faculty. With the division of academic labour has come the fragmentation of academic workers into different categories now frequently represented by different associations. It is quite common for full-time faculty and librarians to be members of one bargaining unit, part-time faculty to be members of a second, and teaching assistants to be members of a third. All three units may represent individuals who teach different sections of the same course, but the academic work of each of these individuals is structured and remunerated in very different ways. Student development personnel and contract researchers may be members of employment groups that are completely separate from associations representing full and part-time faculty. Academic work at Canadian universities is conducted by an increasingly compartmentalized and fragmented workforce.

### **Governments and the "new" economy**

While the changes in the relationship between universities and government have been somewhat less dramatic in Canada than in many other countries, Canada's federal and provincial governments have all undertaken initiatives designed to further development and innovation to meet the needs of the knowledge economy. They have taken steps to increase access to higher education, on the assumption that the new economy requires larger numbers of highly skilled personnel. They have taken steps to reposition the university as a key instrument of economic development and university researchers as central components of a knowledge and innovation infrastructure.

In this new economic environment, knowledge is increasingly commodified. Given that the creation and dissemination of knowledge are what professors do, the repositioning of knowledge in the knowledge economy has dramatic implications for academic work. Intellectual property issues, for example, arise in discussions ranging from the development of course materials to the results of graduate student research.

Government policies also serve to reposition the university in relation to other economic actors. Research-funding policies encourage private-sector support and reward research partnerships and collaboration. Academic research in fields viewed as important to the market thus receive far greater financial support from both industry and the

public purse than research in less “marketable” areas. This hierarchy of funding support is far from new — or at least it can be traced back through the relatively short history of government support of research — but the magnitude of investment and, therefore, the differences between the top and bottom of this hierarchy have never been greater. Recruiting new faculty in certain fields means competing in an extremely competitive, global labour market.

Paid consulting activities, once viewed as tolerated moonlighting, are now increasingly legitimized as contributions to industry relationships and technology transfer. The boundaries between what might once have been defined as “academic research” by the disciplines and research that might once have been defined as too applied or industrial to be a legitimate contribution to scholarship, are blurring. Some academic workers will increasingly have multiple employment relationships involving both universities and industry as a function of their research and consulting activities, just as sessional instructors may cobble together contracts with several universities and private colleges in order to put food on the table.

### **Contemporary challenges**

Academic work has never been homogeneous, but whatever sense of wholeness and community one might have associated with the professoriate have been transformed into an increasingly specialized, fragmented, and hierarchical series of activities performed by a highly differentiated labour force. It has become increasingly difficult to generalize about academic work given the differences between disciplines, the division of labour and multiple employment categories, and institution-based policies and conditions of employment. The situation becomes even more complex given differences in the experience of faculty because of gender, sex, race, and ethnicity.

The role of the disciplines is also changing, perhaps diminishing, as a function of the new research environment. Few real world problems or commercial products involve knowledge that fits neatly into the territorial boundaries of the discipline. Problem-based research initiatives may require expertise from a wide range of disciplines, and the level of support available to these initiatives may be enormous in comparison to the funds given to curiosity-driven research performed by colleagues in a traditional field. Interdisciplinary and multidisciplinary degree programs and research centres are far from new, but they are increasing in number and importance.

While interdisciplinarity becomes increas-

ingly valued within the university, the physicist who participates in interdisciplinary research activities may still be subject to the research, teaching, and publication norms of the traditional subspecialization. We may be applauding interdisciplinary work on the one hand, while assessing this work using processes and standards that do not reward interdisciplinary activity on the other.

As academic work increasingly involves multiple employment contracts, research sponsorships, and partnership arrangements, fundamental questions emerge in terms of ethical practice. Questions of conflict emerge within an environment where the boundaries between of the publicly supported teacher and researcher and the research partner with industry and the private consultant blur. At many institutions, junior faculty are oriented to these complex ethical issues through a brief orientation and an expectation that they will read a long list of policy documents. There is a need for far more conversation: a space for faculty to discuss issues of ethical practice that are far beyond the research training they received in their doctoral program.

Finally, we have the challenge of understanding academic work in the absence of almost any systematic empirical study of academic workers. Aside from basic demographic and salary information, there is almost no national data on the Canadian professoriate. We know surprisingly little about how all of these changes and pressures are experienced by faculty, librarians, and other academic workers within the university. While there is a handful of Canadian scholars in this area, there is a tremendous need for further study of academic work in Canada

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# Negotiating the new academy

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As universities “outsource” more teaching assignments and make fewer full-time, tenure-track appointments American and Canadian universities will have to consider — carefully — what this means, and how to respond to it.

As stewards of the two most highly decentralized systems of higher education on the planet — stewards of chaos as some have characterized it! — we cannot turn to one enlightened knight or a national minister to save the day. Everyone is a knight of a future academic order — by virtue of the small, critical, albeit independent, decisions we make daily about hiring, working conditions, and assignments. In Canada, faculty unions are a much more powerful force than in the United States, so may be in a stronger to safeguard the interests of faculty.

While part-time faculty now account for nearly half the headcount appointments in the United States, the less visible but much more significant development has been the restructuring of full-time faculty appointments. Beginning as a trickle in the 1980s, then gathering steam in the 1990s, full-time, term-limited, contract appointments outside the tenure stream have grown to nearly one-third of the full-time American faculty. When one isolates the data to focus only on new full-time faculty hires over the 1990s and the first years of the 21st century (the American federal government provides a biennial census of all faculty hires) the magnitude of the trend is at once stunningly dramatic and undeniable. Since 1991, more than half of all new full-time faculty hired by American colleges and universities has been off the tenure track. In effect, a parallel alternative to the tenure system has developed, under the radar screen of most academic leaders. Since 1970, the percentage of tenured American faculty has dropped from about two-thirds to just under one-half. If current rates of part-time faculty hiring continue and the present 50-50 split between tenureable and term appointments for newly hired full-timers continues, then (factoring in a four per cent annual retirement rate), only 30 per cent of the full-time faculty in the United States will be tenured or tenureable by 2020.

The situation is a bit more complex in Canada — owing to definitional and cultural

differences. Like the United States, Canadian universities have responded to cost pressures by increasing their use of part-time and full-time, non-tenured faculty—although on a smaller scale. From 1990-1998, the number of part-time faculty increased from 25,700 to 28,200, about 10 per cent. During this same time period, the number of newly-hired, full-time faculty decreased by eight per cent. By 2005, 31.7 per cent of university faculty were contract faculty, with 17.5 per cent working part-time.

A few nuances must, however, be introduced here. First, the situation varies by province, principally between Quebec and the anglophone provinces. Quebec, following the French system, relies heavily on part-time, including hourly faculty. Full-time non-tenure-track faculty are largely unknown there. Indeed, more than one-third of all part-time faculty in Canada are employed in Quebec universities. The use of full-time contract faculty at large, research oriented Canadian universities has increased substantially over the past decade, more than doubling at the University of Toronto, increasing 45 per cent at the University of Western Ontario and rising, albeit less dramatically, at the University of British Columbia. Moreover, the career prospects for full-time contract faculty in Canada appear to be no better (and may indeed be worse) than those in the United States. While full-time contract faculty in Canada more closely resemble their tenured and tenureable colleagues in academic qualifications (indeed, about three in four hold doctorates compared to one in two in the United States), they do not appear to have any more success at moving into tenured or tenureable positions.

The Canadian professoriate resembles its American counterpart in one other fateful respect: age distribution. Over the coming decade, insofar as some provinces have retained mandatory retirement policies for faculty, Canadian universities will be experiencing a significant spike in the retirement of primarily male, full-time faculty, especially in the humanities and social sciences. To what extent they will be replaced by tenure-track appointments or by contract appointments remains to be seen. Interestingly, many faculty who have been forced out of universities due to mandatory retirement policies are increasingly finding employment in the post-secondary sector

as part-timers. Twenty-six per cent of college and university part-time faculty were over the age of 55 in 2005, up from 13 per cent in 1999. These developments will likely reshape the Canadian system, determining whether it will reach the “tipping point” that has already happened in the United States.

We are witnessing the dawning of a new era, not a downturn in the academic business cycle. We have reached an historical watershed not unlike the period more than a century ago when dramatic developments in science and the industrial revolution gave birth to the contemporary research university. New economic circumstances—the decline of the industrial economy, the rise of information technology, new political and cultural circumstances, the rise of global markets — are re-shaping contemporary higher education as profoundly as they are re-shaping all other sectors of the global economy as well as our political lives.

## The economy restructured

As society moves from a goods-based to a service- and knowledge-based economy and as globalization expands the arena in which all businesses must compete, a greater premium will be placed on organizational efficiency, flexibility, and nimbleness. This has led in the larger global economy to a restructuring of work; namely, the end of secure, long-term employment for most workers (where there exists work at all) and the shift to non-standard employment, including more part-time work, leaner “core” staffing levels, and greater emphasis on self-employment and entrepreneurship. Indeed, observers describe the new organization of the workplace as three-pronged: a shrinking core of professionals whose skills reflect the organization’s core competencies; a growing corps of self-employed or freelance professionals and technicians who are hired on an ad hoc project basis; and an expanding corps of contingent workers who work by the hour—and who lack any discernible career track. These freelancers and contingents are not only clerical or blue-collar workers; they increasingly include lawyers, physicians, engineers, and, we argue, professors.

## The university reconceptualized

An increasing number of policy analysts surveying higher education are now viewing it as

an industry or a business—indeed as the core business of the new economy. Some have decried the uncritical application of the “higher-education-as-business” paradigm to the formulation of public policy, reminding us that, historically, higher education has been viewed by the larger society as a social institution, as a steward for a broad set of societal responsibilities, as preparation for young people in democratic citizenship, and for the expansion of knowledge for knowledge’s sake, at least in part. Increasingly, however, public policy debates view colleges and universities less as social institutions to be supported for the long-term good of the order than as businesses producing a product (skilled labour, new technologies), or a consumer service. Proponents of this reconceptualization choose to apply to them the same standards that they would apply to any other business: To what extent does this entity add value, they demand to know. And at what cost? And can comparable value be added more efficiently by other means?

There has been a basic change in how government and the public generally have come to think about higher education and the academic profession. Their increasing focus on performance, accountability, value-added, and costs reflects a conception of the university as an enterprise and embraces a fundamental trade-off; that is, the reduction of social benefits to achieve the immediate, short-term satisfaction of economic growth. Higher education is seen as a private rather than a public benefit, and increasingly the sovereignty of the marketplace is seen to apply to it. These trends have given impetus to the “corporatization” and “privatization” of post-secondary education. In fact, higher education certifications and degrees are now included as commodities subject to free trade policies as part of the General Agreement on Trade and Tariffs. Furthermore, as the new conceptualization would have it, this sector of the economy should be responsible for paying an ever larger share of its own freight.

### **Information technology restructures**

In meeting these new imperatives, the information technology revolution has provided new sets of analytical tools and laid bare the contingent character of previous economic and organizational arrangements for delivering higher education. The creation, presentation, dissemination, and preservation of knowledge are based on a set of familiar technologies (the book, the classroom) and traditional economic arrangements (the face-to-

face course and the full-time, integrated faculty role). As technology and economic requirements change, so does the structure of institutions performing those functions.

Information technology makes it possible to disaggregate educational processes and thus reconfigure the landscape of the university. New providers may emerge who will target specific processes as sources of businesses. The pieces will be re-aggregated under arrangements that are different from the old. Consider the emergence of new kinds of organizations such as Blackboard and E-College that allow colleges to outsource their instructional platform. Or the outsourcing of student remedial and supplemental education services and counseling through reconfigured organizations such as Sylvan Learning Systems or Stanley Kaplan. At the core of previous economic and organizational arrangements—at least during the twentieth century—were the course and the credit as the standard units defining student academic performance. Most important was the full-time professor concurrently engaged in teaching, research, and institutional and professional service. Such a career has been, at least since World War II, the standard unit of academic labour—the prototypical American scholar. Since higher education has historically been a labour-intensive industry, characterized by high and fixed labour costs (the fixedness a function of traditional tenure systems), restructuring has focused on reducing the level and rigidity of labour costs. In the United States, Canada, and throughout Europe and Asia, this has meant widespread experimentation with entirely new models of delivery of instruction (the “open university” model), aided and abetted by new developments in information technology, most notably the advent of the Internet, which allows for widespread access to content worldwide and thus savings through the unbundling of course design and development on the one hand, through course delivery and student interaction and assessment on the other.

In the United States, Europe, India, Australia, and Japan, this has also meant extensive tinkering at the edges of the traditional model of faculty work via a surge in the appointment of part-time faculty, whose role and compensation are limited to a particular course. Not only do they have a teaching-only role, but their teaching also constitutes piece work, where they are paid by course or, as in France, by the hour.

Less obvious (but no less widespread) have been attempts to functionally re-special-

ize the full-time faculty role; that is, to create full-time positions that do not follow the integrated (and costly) teaching-and-research model but a more functionally specialized model. Full-time faculty are now hired into teaching-only streams or, in the natural sciences and the professions, research- or clinical-only streams. Some are taken on even in primarily administrative roles, in program development and management.

Quo vadis?

If we are witnessing a structural reconfiguration of the system, then what ought to be the faculty response, especially in Canada, where unionization allows for a stronger collective response than in the United States?

While I cannot pretend to provide a blueprint here, what I can do is suggest some basic principles that ought to guide the faculty’s collective response, if it is to advance the interest of the profession in the long term. The basic ones include:

Welcoming change—selectively. The system is moving toward a new equilibrium and while it is unlikely that the basic direction of the movement can be stopped (nor should it), it can be shaped or managed by those with a larger vision.

Separating the wheat from the chaff. Like any broad socio-economic and political movement, change is not uniformly good or bad (although it does not appear on the whole promising in the near term for the academic profession’s prospects, as we have come to know them over the past half century. Many faculty a century ago were denouncing (and resisting) the emergence of the research university as an abomination!! What needs to happen is a thorough and honest thinking through of the costs and benefits of the new academic order — and some assessment of what costs are acceptable and what costs are not acceptable in the national (rather than parochial self) interest.

Fighting for what is critical to the long-term health of the system and denouncing what is unhealthy with a clear articulation of the public’s, as opposed to the faculty’s, stake in the outcome.

While eras of transition are not comfortable, they are dynamic and exciting. The next 20 years will be anything but dull. Canadian faculty, with its tradition of unionization, may be better positioned to shape the transition than their less collectivized colleagues in the United States.

This article was also published in the April 2007 issue of *Academic Matters: The Journal of Higher Education*.

### The rising profile of women in academia

Deborah Sussman and Lahouaria Yssaad, Labour and Household Survey analysis, Statistics Canada

Over the past several decades, Canadian women have made significant inroads into many traditionally male-dominated occupations. Increased labour force participation and higher levels of education have led to women's growing presence in a wide range of occupations (Hughes 1990, 1995), including full-time university teaching.

Women's representation in university faculties is an important issue for several reasons. Firstly, they provide positive role models for the growing number of female students entering university and on the verge of a career. And while one does not have to be a woman to be supportive of female students, some have suggested that women make their classrooms more inclusive by using teaching styles and examples that are friendlier to their female audience (Chen, 2004). Finally, at a time when universities are expected to also contribute to the economic and social well-being of their local communities (Lewington, 1995), equity concerns may prompt employers to ensure that their workforces reflect the qualified candidates available.

Women's representation at the university level has not been uniform at all ranks of academic appointment and across all fields of instruction (Lee, 1993). This article looks at the growth in the number of women teaching full time at universities between 1990 and 2004, examining changes in their representation by academic rank, tenure, and field of instruction. Academic credentials, age structure, and earnings are also examined.

#### Impressive gains for women

In 2004,<sup>1</sup> just over 12,000 women full-time faculty members were teaching at more than 70 universities. Except for a slight drop in 1996, women's presence increased steadily after 1990. In contrast, the number of men was relatively stable during the early part of the 1990s, but dropped steadily from 1993 to 1999. This was followed by marginal increases from 2000 onwards. As a result of these opposing trends, the relative presence of women increased from

20 per cent to 32 per cent.

#### Faculty women younger than their male colleagues

The age structure of university faculty is comparatively older than the workforce in general, with a median age of 49 years in 2004. Nevertheless, female faculty members tended to be younger than their male colleagues, with a median age of 47.

This age differential held in all fields of instruction with the youngest women being in engineering and the applied sciences, and in mathematics and the physical sciences. Women tended to be older in the more traditional fields, such as education, fine and applied arts, the humanities and health.

#### Strengthened presence in both traditional and non-traditional disciplines

The vast majority of female full-time faculty members are clustered in certain disciplines: health (mainly in nursing and rehabilitation medicine), humanities, and education. Together these accounted for 51 per cent of women versus 34 per cent of men in full-time faculty positions in 2004. In contrast, only a minority of women (nine per cent) taught in engineering and applied sciences, or mathematics and physical sciences (compared with 24 per cent of men).

What has improved over time, however, is the share of women in all fields of instruction. From 1990 to 2004, the proportion of full-time faculty positions they held increased dramatically and steadily in all disciplines, including the non-traditional fields of engineering and applied sciences, mathematics, and physical sciences.

#### Notable gains in tenured status and academic rank

Women also made notable gains in tenured status<sup>2</sup> over the period. In 1990, only 14 per cent of all tenured staff were women, but by 2004 this had doubled to 28 per cent.

Related to tenure is the presence of

women within the different academic ranks. Although at successively higher ranks women continued to hold a declining portion of academic posts, their relative standing improved greatly. While only eight per cent of all full professors were women in 1990, this had more than doubled to 19 per cent by 2004.

Similarly, only 20 per cent of associate professors in 1990 were women; by 2004 this had increased to 35 per cent. Women's presence grew in the lower ranks as well. Gains were seen in all disciplines, including those traditionally dominated by men.

Another aspect of gains among women academics is the rising proportion of female faculty members who are full professors or associate professors. In 1990, only 15 per cent of women working full time held full professorships, while 35 per cent held associate professorships. By 2004, 22 per cent of women were full professors and 34 per cent were associate professors, for a total of 56 per cent in the upper echelons. While not yet at the high concentration of their male colleagues (73 per cent), the situation for women appears to be slowly improving.

In spite of this, women continue to have a weaker presence at the upper academic ranks and among tenured faculty generally. However, when age is factored into the analysis, its importance becomes apparent. For example, almost half of all male tenured faculty were 55 or older, compared with just over one-third of their female colleagues. Most tenured women were between 40 and 54 years of age.

A closer look at academic rank attained also reveals important age distinctions between the sexes. While there were similarities among those under the age of 40, significant differences were evident in older age groups, particularly at the full professor rank: 39 per cent of men but only 20 per cent of women 40 to 54 were in this category, as were 70 per cent of men but only 45 per cent of women aged 55 and over.

#### Educational qualifications rising

The academic credentials required for many occupations in the economy have generally

increased, including in the academic labour market, where more and more full-time faculty members hold doctorates. In 2004, 82 per cent of all male faculty members held a Ph.D. (or other doctorate), as did 73 per cent of their female counterparts—a significant change from 1990, when the figures were 73 per cent and 56 per cent. Virtually all remaining faculty members held either a master's or professional degree.

However, while almost half of all male faculty members with doctorates were full professors, only about one-quarter of their female counterparts held such positions in 2004. In other words, nearly three-quarters of female faculty members with doctorates were either associate professors or assistant professors. The corresponding proportion for men was 52 per cent. In short, women with doctorates tended to be found in the lower ranks, with little change in these standings since 1990.

This may seem to suggest a lack of upward mobility for women, particularly to full professor. However, other factors may also be at work. First, women's lack of seniority may reflect their relatively recent entrance in large numbers into the academic labour market, which would tend to make them younger on average. Indeed, the proportion of women with doctorates who had reached the full professor level by 2004 increased dramatically with age.

Secondly, women's tendency to experience more work interruptions (because of maternity leave or periods of part-time employment due to family-related commitments), may also influence their professional experience and opportunities for promotion. Differences in time spent on research activities and in research productivity may also be factors (Toutkoushian, 1999; Donaldson and Emes, 2000).

### **Women earn less than their male colleagues**

In 2004, the median salary of female faculty members was some \$13,500 lower than that of their male colleagues. With university salaries scaled according to rank, however, much of the difference can be attributed to women being disproportionately in the lower ranks. When the median salaries of men and women of equal academic rank are considered, the difference narrows substantially—from \$6,000 at the full professor level to \$1,800 at the assistant professor level.

The principal subject taught also affects median salary differentials. In 2004, male-female differences in median salaries were lower among faculty members in education and fine and applied arts—disciplines with higher concentrations of women and lower

median salaries generally. By contrast, greater earnings differentials were noted in social sciences, mathematics, and engineering—disciplines with the highest median salaries and comparatively lower proportions of women.

### **Women's increased presence in academia likely to continue**

One of the sources of opportunities for the recruitment and advancement of female candidates is the growing pool of female Ph.D.s. Indeed, the number of doctorates being awarded to women has risen significantly during the period 1992 to 2004. Their share of doctoral degrees has climbed steadily since 1995.

Despite these gains, some disparities remain. For example, in 2004, women accounted for more than half of all Ph.D.s awarded in education, social sciences, the humanities, fine and applied arts, and health<sup>3</sup>. By contrast, they continue to be poorly represented in the traditionally male-dominated fields.

### **Summary**

Women have increased their presence among full-time university faculty during a tumultuous period of shrinking budgets, rising enrolments, and increasing tuition costs. This trend has been fuelled by the rising educational attainment of women generally, as well as a growing academic workforce reaching retirement age that consists mainly of men.

As of 2004, one in three Canadian academics were aged 55 and over, most of them men. The anticipated retirement of the majority of them in the next decade or so—in conjunction with the growing pool of women with doctoral degrees—bodes well for the future hiring of women, their rising representation at all levels of academe, and their continued advancement into the higher ranks.

1 Dates refer to academic years. For example, 2004 figures pertain to the 2004-05 academic year.

2 Tenured status is not available for staff in Quebec universities and is not included in these calculations.

3 This includes parks, recreation and fitness.

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# Walking the Colour Line: The Angst of South Asian Faculty

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South Asian faculty members have been largely excluded from academia as definers, producers and conduits of knowledge. Mainstream orientation, which is one-sided, is reflected in curricula, scholarly structures and organizational assumptions.

As minority faculty in academe aim to carve out critical spaces for themselves, salient questions arise. What does it mean for minority faculty members to inhabit institutional space in Canadian universities? What role does their teaching and collective knowledge have in the halls of white academe? What strategies do they employ to counterbalance a Eurocentric curriculum, bear resistance from mainstream students, tolerate unfair evaluations and put up with a lack of administrative support? What can be done to foster a welcoming campus climate?

In trying to answer these questions about the racial experiences of South Asian faculty members, I conducted in-depth interviews with a selected sample between 2001 and 2006. This group consisted of 17 (nine female and eight male) South Asian faculty members in a predominantly white academic environment in Canada. This investigation explicates the problem of the colour line that South Asian faculty members experience within the university.

All interviewed faculty members affirmed that the curriculum was essentially Eurocentric with an overemphasis on western civilization, inventions, and discoveries — and inadequate references made to the historical contributions of people of colour. A mainstream curriculum pervaded not only in most of the arts but the sciences as well. In the sciences, there were glaring omissions and silence regarding inventions and discoveries that were made in developing countries throughout history. A science professor in this study remarked: “There are lapses and silences regarding inventions and discoveries in the sciences not incorporated in the curriculum. Scientific inventions and discoveries made in the developing world are generally not referred to or given credence. This is absolutely inexcusable.” A professor in the faculty of education reiterated: “Noteworthy minority contributors to knowledge such as Gayatri Spivak, Chandra Mohanty and Edward Said are seldom included in the readings.” Another science professor observed: “In my department, due to

my status as a professor of colour, I am the underdog. Even though the sciences try to be more objective than the arts, I have seen racism rampant in the form of colleagues not giving proper credits or citations to minority faculty when a new formula is discovered.” An inclusive perspective with a vision of equality and justice is necessary to overcome intellectual bias.

The blatant resistance of mainstream students to the few minority courses taught perpetuates racism on many campuses. Participants in the study assert that there is deliberate resistance or opposition of mainstream students to embrace knowledge or learn any information related to racist or sexist issues. Educational programs on minority concerns that challenge the structures of academia and the racist canons of disciplines have been met with a range of reactions from polite indifference, aloofness, disdain, and arrogance to open resentment from mainstream students. As a result, South Asian faculty members are faced with enormous trials and impediments not only in their pedagogy but also in their careers.

One South Asian faculty member who taught courses on minority issues confirmed: “When I was discussing an issue relating to the developing world, this mainstream student openly made the remark that it was a waste of time going into a discussion on the topic since none of the students had anything to say about it. She walked out of the class, which made me feel humiliated. When I talked to her about it before the next class, she was blatantly rude and said that it was the tuition fees of students that paid my salary and that I should not be wasting students’ time in pursuing discussions that were of little interest to them.” Another stated: “It was extremely difficult for me to discuss race issues in class. There was uncomfortable silence...no enthusiasm... [and] I had to do the talking all the time. Those who participated in the discussion stated that there was no racism anywhere and were in a constant state of denial.” Such open antagonism displayed by majority students causes discomfort, distress and anxiety for South Asian faculty.

Student evaluations of South Asian faculty members are, generally, below the global average. All the faculty members who were interviewed candidly reported about the unjust and unreasonable manner in which they were eval-

uated and the effect these assessments had on their careers. One expressed this view: “I find the process unfair and unjust. Even excellent teachers face the brunt of these procedures. It is biased students who evaluate minority professors poorly, and I am fed up with the process.” Such flawed and erroneous evaluations negatively influence career growth and professional development of minority faculty members. Another South Asian faculty member stated that: “Even in departments where diversity is supposed to be celebrated, faculty of colour are not recognized or merit given to their credentials. A single mistake committed is magnified ten-fold and spread around the department.”

Lack of administrative support can range from secretarial negligence, tampering or delaying work to postponing procedures in tenure and promotions. Clerical negligence and tampering may involve a deliberate attempt on the part of white office staff to sabotage the work of minority faculty members. A South Asian faculty member in the sciences remarked: “Support staff can often be barriers for success for those who are not mainstream. A biased secretary can easily delay work on the excuse that he or she has more urgent things to do, or do it poorly so it generates more work for the faculty member. Or a junior staff can ‘lose’ items.” Further research on non-Canadian topics is, generally, not encouraged, and it is enormously difficult to get funding for such topics. An interviewee noted: “My research proposals pertaining to minority issues have been unsuccessful for the past many years. I have not been able to get a SSHRC (Social Science and Humanities Research Council) grant at all. With little or no money, how can minority faculty members do research and publish?” Research on minority issues has less theoretical value and, when published, must be in mainstream journals. This minority professor spoke of the insensitivity and indifference of administrators to this dilemma.

In addition to the stress on tenure and promotions, South Asian faculty members felt the extra burden of not only organizing new courses and programs but also of counselling and supervising additional students of colour. With few minority faculty members on campus and with students of colour under the stress of racism themselves, faculty of colour are often

faced with bearing the students' emotional burden in greater intensity. In some cases, in my observation and interaction with faculty of colour, there was friction between minority faculty and students of colour over the lack of attention that the former showed the latter. Students of colour were not able to go to white faculty for fear of being misunderstood or not being given the appropriate guidance in minority issues and were forced to impose themselves on minority faculty. One South Asian faculty member stated: "Many a time, there are strained and hostile relations between me and students of colour. This contradictory and conflicting dynamic between faculty of colour and minority students is rarely acknowledged." Administration is seldom aware of these unique problems within departments.

To create a congenial and supportive work environment for South Asian faculty members, a science professor summed up: "First, the administration should admit when faculty members in the arts and sciences are predominantly from one homogenous group. Secondly, education in the form of on-going, anti-racism training for all faculty (not just those in leadership positions) is absolutely necessary. Thirdly, a conscious attempt by the university [should be made] to recognize the challenges of South Asian faculty and the major contributions of developing countries. Fourthly, a reward system should be primed for the diversity efforts of mainstream faculty. Finally, a mix in faculty should represent a critical mass that represents Canada's diverse society."

# Section Three

## Academic Work and Research

### **Intellectual Property Ownership on Campus: IP, Commercialization, and the Future of Academic Work**

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Intellectual property issues are becoming increasingly important on the campuses of Canadian colleges and universities. The days are over when it could be taken for granted that one was protected by the rules governing the creation, ownership, distribution and use of intellectual goods. The heightened attention paid to intellectual work in the economy means more thought needs to be given to these formerly arcane and specialized areas of the law by faculty and students alike.

The economic value of intellectual work is seen in the trend toward collaborative efforts between academic institutions and the private sector. This trend has resulted, among other things, in more commercialization on campus. The consequences of increased commercialization can be seen in the rise on campus of branding, fees for service, reliance on corporate funding, and a shift toward contract or casual employees.

In tandem with this trend, universities have focused on patent rights, which protect inventions. Many universities have established “industry liaison” or “technology transfer” offices to facilitate the commercialization of academic research.

The recent strategic plan released by the Ontario Ministry for Research and Innovation presumes this trend is an economic plus. The plan seeks to encourage research aimed at producing marketable innovations that can be efficiently commercialized in order to help make the province more competitive. But using this approach skews funding away from basic research and toward applied projects with more likelihood of short-run commercial exploitation. Other negative implications that have not been fully considered by policy makers include restrictions on publication of research findings and the loss of academic autonomy in setting research agendas. Canadian universities are also now expanding their focus on intellectu-

al property issues to include rights under copyright, which protects expressions fixed in a tangible medium such as a book, class presentation, or an article such as this one.

Both patent and copyright laws are made at the federal level. Changes to the copyright and patent acts, either by legislation or through interpretation by the courts, may have profound impacts on academic and research work. In recent years, faculty, students and campus administrators have generally been on the same page and have worked together to influence federal policy. For example, they share the concern that copyright law does not become so restrictive that fair and reasonable educational use or copyrighted works are inhibited.

At the same time, the allocation of ownership rights under patent and copyright laws usually takes place at the institutional level, and there is more of a divergence of interests here. Where the fruits of academic research have the potential to generate revenues, the universities become more interested in asserting an ownership position. We’ve already seen complex clauses in collective agreements allocating patents and the resulting royalty rights. In the case of a contract between a university and a private corporation for joint research, the stakes are even higher and the implications are more profound. Since obtaining a patent requires novelty, corporate partners want to place limits on the ability of academic researchers to share their work with others. Publishing articles, giving conference presentations, or even teaching might constitute enough of a disclosure to defeat the patent. But sharing work with peers and students is the hallmark of traditional academic practice.

The concern with ownership of copyrights is similar, but it seems more geared to teaching as opposed to research, and more directly related to saving labour costs than gaining royalty income. The tension in copy-

right law on campus tends to be between cost-conscious administrators and the traditional arrangement where tenure-stream faculty retain all interests in their works.

This tension is exacerbated by the growth of distance education and other “technology enhanced learning” programs. Administrators may prefer to hire teachers on a contract basis rather than commit to hiring a tenure-track professor. Another approach is to set up “work for hire” arrangements in which a contract or casual employee prepares specific course materials for re-use. These contracts invariably assign all ownership rights to the university, not the academic author.

The importance of contracts in the areas of patent and copyright law cannot be overemphasized. As an academic worker, it would be a big mistake to think that your rights are set and protected solely by federal law. That mistake would be compounded if you were to accept any contract that is offered without trying to negotiate better terms. Negotiation is particularly important for those not protected by a collective bargaining agreement.

# Big Science, boundary organizations, and the academy

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Scientific research has become so complicated and demands such enormous apparatus that only the State or immensely rich patrons can pay for it, which in practice means that a disinterested search for knowledge is cramped by the demand for results that will justify the expense.

—Robert Graves

There is a tendency to view Big Science, and its associated problems, as a recent phenomenon. But my 40-year-old epigraph by novelist Robert Graves indicates how long such worries have dominated the academic horizon. Moreover, Graves, in this one paragraph, captures many of the issues that Big Science raises today: the loss of academic autonomy and objectivity, the increasing dominance over research by state and commercial sponsors and their steering of the research agenda, and the sacrifice of basic inquiry on the altar of “results.” Such continuity is both reassuring and disturbing. The contemporary models of Big Science deserve some examination, including the implications for democracy about the way it is organized and funded.

States invest in Big Science for strategic purposes, whether to gain military or economic advantage, international prestige, or social benefits. Think, for example, of the big “hard science” projects of the past: the Manhattan project, supersonic flight, nuclear power, particle accelerators, and the space shuttle. Today, research in the life sciences—once the “soft” poor cousin—attracts a similar scale of financial, material, scientific, and human resources.

Traditionally, biological research took the form of small, grant-funded studies conducted by individual investigators. Large-scale projects are a recent phenomenon that began with the effort to map the human and other genomes. Like other countries, Canada now invests huge sums in large-scale biological research in the hope of deriving direct social and economic benefits. Investments in Big Biology are funded and governed through hybrid, public-private arrangements that stand outside conventional funding bodies and academic structures. These intermediaries include Networks of Centres of Excellence, the Canada Foundation for Innovation, as well as the national and regional centres of

Genome Canada. The political scientist and science policy theorist, David Guston, calls such bodies “boundary organizations.”

These organizations act as agents of the state in enacting policy and adjudicating and allocating funding for research. As well as the navigating the ambiguity of their corporate organizational form (are they public? private? in between?), they must also deal with the expectation that they will advance both public and private interests. The ambiguity is only partially resolved by a third form of engagement: that of “translational science,” a process that moves discoveries from the laboratory into the market, the clinic, or society at large.

## Organizational and funding issues

Funding directed through these novel organizations carries stipulations that transgress traditional academic values. First-rate science is necessary but no longer sufficient; evidence of “due diligence” in non-scientific matters is also demanded. Among other details, research proposals must demonstrate that co-funding or matching funding has been secured; that partnerships with pharmaceutical and biotechnology companies are in place; that intellectual property policies are in order; that social and economic benefits are delineated; and that a project management team is “taking care of business.” In the case of Genome Canada, for example, a project will not proceed to scientific peer review if it fails the “due diligence” phase. Readers might recall the furor this policy caused when proposals of internationally prominent scientists were rejected on non-scientific grounds, never having been reviewed for scientific merit.

Such stipulations are principled to the extent that they protect public investments in large-scale research and attempt to capture its socio-economic benefits for the public. But they are perceived to be at odds with the public interest to the extent they impede scientific advance through public mechanisms and institutions, measured against the standard of peer review. Many worry that in directing large pools of research funding to strategic ends, the state promotes a particular type of science—one that can be readily commodified and marketed—over other science that produces non-market solutions or longer-term contributions

to our knowledge and to research training.

The venerable Canadian Society of Biochemistry, Molecular and Cellular Biology, founded in 1957, for example, has expressed its “deep concern” about “the risk of compromising the rigor of Canadian research” if the new trends continue. In a 2005 policy document, the society argued that focused, investigator-driven, basic science, funded and adjudicated by traditional research councils, is the scientific gold standard and, ultimately, socially and economically productive. In contrast, they said, new “discretionary” pools of funding directed to large research teams and to economic spin-offs are often wasted on premature commercialization efforts.

The novel mix of academic values, commercial values, and public policy expectations now at play in large-scale science invites a number of questions. We need to learn how these multi-centre, academy-industry partnerships actually work and to investigate the implications of mixing public and private interests. How are scientific, commercial, and social values reconciled and negotiated? What costs and benefits accrue to investments on this scale? A fundamental question concerns how these new bodies protect the public’s stake in the maintenance of a vibrant and growing base of public-domain knowledge as well as the translation of basic research into useful applications. A second set of issues relates to the tensions between traditional research bodies (such as universities, academic hospitals, and research councils) and the new organizations set up to manage Big Science. What cultural and normative differences are at work between new and traditional bodies? How are these differences operationalized? What is the nature of their impact?

These questions illustrate the complex interplay of scientific, academic, commercial, and public interests at work in the re-scaling of the research enterprise. To fully understand their salience, however, we need to ask: What is the problem that boundary organizations were set up to solve? The answer lies in the social contract for science and what Guston describes as “the general problem of delegation.”

## Principals and agents

A contract is an arrangement between principals and agents in which the former delegates

performance of a task to the latter. Delegation occurs because the principals are unable to perform the task for themselves, usually due to a lack of technical competence or information. The general problem of delegation is captured in the terms “adverse selection” and “moral hazard.” The first term concerns the difficulty of selecting agents who share and will advance the principal’s interests. The second describes the problem of ensuring the principal’s goals are actually pursued. Simply put, agents always know more about the tasks delegated to them than principals do. How can principals be sure they are getting what they pay for, and how can agents provide that assurance?

Under the old social contract for science, the state delegated these problems to the “republic of science” itself. Science was understood as a self-governing institution functioning within a powerful, normative structure. Under the new “market-driven” social contract for science, however, the principal’s goals now emphasize short-term social and economic utility in a way that often runs counter to traditional republic of science norms. So how should problems of delegation be handled in these circumstances?

One solution would be for the state to manage research performance directly, but that runs counter to the current managerial zeitgeist. The preference is for refined forms of “remote control” or state steering. To that end, new, purpose-built agencies—boundary organizations—are constructed on the border between science and policy. Boundary organizations stand outside the state apparatus yet are funded from public sources to act as agents for the state in the realization of policy goals. In turn, scientists become agents of the boundary organization, which monitors their performance and ensures they are following the correct agenda. But while the state has effectively delegated the management of research, problems of information asymmetry, moral hazard, and adverse selection have not been eliminated; they have simply shifted down a level to the new agent. With these principal-agent chains, we seem to encounter infinite regress as principals tend to be agents of higher-order principals, agents become principals in secondary relationships, and problems of accountability endure.

In the republic of science, accountability is established through peer review and reputation. Although they are increasingly made subordinate to non-scientific stipulations, these traditions are preserved in boundary organizations.

But political accountability is somewhat different. Here, we encounter two layers. The

first is performance accountability, which runs from the boundary organization towards the state. The second is democratic accountability, which runs from the state down towards its citizens. To the extent that Guston’s theory of boundary organizations focuses on the first and neglects the second, it is incomplete. The notion of democratic accountability, I suggest, demands a normative dimension lacking in existing formulations.

To make sense of the theorizing, let’s turn to a contemporary example of a boundary organization in Big Science.

### **Genome Canada**

Charged with fast-tracking Canada’s late entry into genomics, Genome Canada and its five (now six) regional centres were established in 2000 with lump-sum, multi-year budgets. Industry Canada is the lead federal agency for genomics. As a result, the scale of public investments, and the scope of the research projects are in an order of magnitude larger than earlier programs. The Genome Canada system manages more than a billion dollars in research funding, derived predominantly (89 per cent) from public sources. For a small country like Canada, the research investments are unprecedented. By any measure, genomics is Big Science.

At the same time, in establishing the Genome Canada system, Industry Canada created a form of governance that breaches conventional notions of accountability yet is entirely consistent with managerialism. Despite their research mandate and public funding, the genome organizations were incorporated as private, non-profit companies rather than as traditional research councils. Neither truly private nor fully public, these companies stand outside conventional frameworks of governance and accountability. Although they are private corporations, they answer to no shareholders or members. Moreover, citizens have no general rights to information about private companies. Although the genome organizations are publicly funded, they also escape normal mechanisms of public oversight. The auditor-general’s mandate, for example, is confined to public departments and agencies, as is access to information legislation. There is no direct ministerial responsibility to Parliament and no obligation on the agency to report on its performance to the public. There are few mechanisms for external complaints and redress.

A final distinguishing feature of the way Genome Canada manages genomics is the institutionalization of claims to a form of moral governance, through funded programs of research in the broader social and ethical aspects

of genomics. Such programs are again consistent with the underlying ideology; contributing to steering “from a distance.” As French philosopher Michel Foucault argues, the most disciplined subjects are those who internalize the dominant ideology and discipline themselves. Through these programs, the genomics community internalizes critique and allows the state to detach from direct governance.

### **Discussion**

Boundary organizations in research are complex corporate bodies charged with fulfilling (and managing conflicts between) social and economic mandates. Like any organization, they are sites of power and display multiple imbalances in power relations. In addition, they command significant public resources while lying in a “third space” outside conventional accountability structures. But, to me, public accountability seems to be a primary democratic requirement that the state cannot discharge by delegation. In the principal-agent chain, citizens are the primary principals. Holding decision-makers to account enhances the integrity and perceived legitimacy of public governance. London School of Economics philosopher Luc Bovens wrote in 2003, “Democracy means nothing if those in power cannot be held accountable, in public, for their acts and omissions, decisions, policies and expenditures.”

We need to think through the broader implications of delegating implementation of the social contract for science to non-public institutions. In her book, *Systems of Survival*, urban theorist Jane Jacobs contrasted two moral syndromes—the commercial syndrome and the guardian syndrome. The former describes the value structures of commerce, the latter of public service. But what value structures shape the moral landscape of agencies that occupy the boundary between these arenas?

The emergence of large-scale research organizations sets up a number of questions that are ripe for empirical investigation. First, given the sums of money and interests involved, how do we ensure adequate governance and accountability? A sub-question is: to whom is accountability owed, given that most of these organizations have no shareholders, no association membership, no citizen representation, no public service role, and so on. Second, specific to managerialist reforms, what are the constitutional safeguards when the state bypasses long-standing research institutions and mechanisms in favour of privatized agencies? Finally, how do we characterize the relationship between aca-

democratic institutions and boundary organizations? Do the latter undermine academic autonomy? Are the former any better in terms of governance and accountability?

These are complex issues that we are only beginning to address. And while they concern scientific research, they are not “scientific questions.” Rather, they demand humanistic debate engaging the liberal arts and sciences. Debates and inquiries are futile otherwise.

### **Conclusion: “On being the right size”**

As British geneticist and evolutionary biologist J.B.S. Haldane argued long ago, nature makes animals the right size for their purpose. A large change in size inevitably carries with it a change in form. The same is true, Haldane suggested, for every human institution. There is an optimal limit beyond which animals and organizations ought not to grow.

Borrowing Haldane’s principle, economist Leopold Kohr in 1957 formulated a theory of size, postulating that small organizations, cities, and states work better than their larger counterparts. Pointing to the law of diminishing productivity, he argued that “wherever something is wrong, something is too big,” and advocated a return to the human scale. Jane Jacobs also follows Haldane, suggesting that “the costs of complication exact their own high price” when organizations become large and bureaucratic. These perspectives help illuminate what happens when the model of Big Science—developed for international prestige projects in high-energy physics and human genomics—is generalized. Large research networks and collaborations can generate diseconomies of scale. First, big investments in science need to be managed and coordinated by the new bodies, meaning big bureaucracies are required. Second, big investments in science need to be justified, meaning the mass production of publications, patents, and partnerships and often counterproductive levels of measurement and reporting.

Research shows that Big Science can frustrate face-to-face community building and social-capital elements of trust and reciprocity necessary for effective collaboration. Science is a human-scale enterprise, anchored in local communities of practice. It may be that hundreds of smaller projects, with access to shared technologies, are, ultimately, a better investment than a few large-scale projects that sprawl across multiple boundaries. But at present, how to test that claim empirically is quite beyond me.

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