

Report to the Minister of Industry of the
Ad Hoc Panel on CERC Gender Issues

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- iii. That the CERC program design be changed so that: Phase 1 of the Program no longer short-lists more Chair proposals than there are funded Chairs available in Phase 2; or alternately, that the number of Chair proposal advanced to Phase 2 be closer to the number of available Chairs.
- iv. In the event that the CERC Program uses priority and sub-priority areas, greater emphasis should be placed on ensuring multidisciplinary approaches and consideration should be given to having an “open” category for projects outside of the identified priority areas for the competition.
- v. That the Council of Canadian Academies be charged with undertaking an assessment of the advancement of women in research careers in Canada.

Mandate

In his letter of March 26, 2010 (attached), the Minister of Industry mandated the members of the Ad Hoc Panel on CERC Gender Issues to examine the following matters and provide recommendations to him by April 23, 2010:

- i. The Ad Hoc Panel will examine the lack of female representation in the Canada Excellence Research Chairs (CERC) Program final stages, providing a report to the Minister of Industry that provides advice on how Canada can best pursue world-class excellence in attracting and retaining top researchers through the CERC program, while seeking a field of candidates that reflects the talented women and men among the world's top-tier researchers.*
- ii. Specifically, the Panel will examine this year's CERC process and offer recommendations on the improvements that could be made in the future with respect to the program design, outreach, candidate recruitment, and the selection process to address the objectives outlined in section (i).*

This report concludes the work of the Ad Hoc Panel on Gender Issues and provides our recommendations.

The members would like to thank the Minister for the opportunity to examine this important issue. They also wish to acknowledge the support of the Secretary to the Panel, Mr. Iain Stewart, Assistant Vice President of Research, Dalhousie University, and the staff of the Science and Innovation Sector of Industry Canada, as well as the CERC Program secretariat and the three federal granting councils for their timely and helpful provision of documents, information, and data.



Ms. Elizabeth Dowdeswell
President, Council of Canadian Academies



Dr. Suzanne Fortier (Chair)
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1. Introduction

Talented, skilled and creative people are the most critical element of a successful economy and society. Increasingly, countries are supporting the international mobility of both students and researchers, seeking to attract the top talent from around the world, and connect domestic researchers to global networks of ideas, insights, and innovation. International collaborations, partnerships and exchanges expose Canadians to leading-edge research, and help forge ties with the wider world that can translate into future research and commercial successes. Similarly, foreign researchers and students coming to Canada, whether just for a short time or for an entire career, bring knowledge and ideas to our country that enrich our learning and research environments. If they eventually return to their country of origin, they help build linkages and networks with institutions in their home countries.

With these objectives in mind, the 2008 federal Budget announced the Canada Excellence Research Chairs (CERC) Program. The CERC Program is intended to attract the world's top researchers to Canada and support them to develop ambitious research programs within the four priority research areas set out in the federal S&T Strategy, *Mobilizing Science and Technology to Canada's Advantage*. The four priority areas are: environmental sciences and technologies; natural resources and energy; health and related life sciences and technologies; and information and communications technologies. Each university successful in winning a chair from the CERC Program is awarded up to \$10 million over seven years for the chair holder to assemble outstanding research teams and undertake cutting-edge research.

In this regard, the inaugural competition of the CERC Program has been a great success, awarding 19 Chairs to an array of truly outstanding researchers within the four S&T Strategy priority areas. However, all of the 19 Chair winners are male. Given the leading contributions of Canadian and international female researchers across the range of research disciplines and fields, this outcome is troubling and requires an examination and redress. Excellence in science, technology and innovation necessitates the insights and contributions of the best minds. The full contribution of all, regardless of gender, is not only an equity imperative, but also a pragmatic reality. In a global competition for talent, and with an aging workforce, Canada needs the contribution of everyone.

All three of the members of this Ad Hoc Panel were involved in the inaugural CERC Program competition, whether applying from a university, leading the Review Panel, or overseeing the process from the Steering Committee. We believe strongly in the Program, and were pleased to have the opportunity to provide recommendations to ensure the inclusion of women researchers in this important federal initiative. This short report is divided into five sections: this introduction; an overview of the inaugural CERC Program competition; an examination of the relevant wider university context; conclusions; and five recommendations.

We believe, in a diverse and interconnected world, the goals of equity and excellence are intertwined: equity ensures the largest pool of qualified candidates, without affecting the integrity of a selection process focused on excellence. We hope our advice ensures the CERC Program exemplifies this and continues to attract the world's best to Canada's advantage.

2. The Inaugural CERC Program Process

The Canada Excellence Research Chairs Program, announced in the federal 2008 Budget and launched September 2008, invests up to \$28.6 million a year to create up to 20 prestigious research chairs in Canadian universities. The Program is designed to attract world-leading researchers and to help Canada build a critical mass of expertise in the four strategic priority research areas set out in the federal S&T Strategy, *Mobilizing Science and Technology to Canada's Advantage*. For each Chair, the winning university receives up to \$10 million over seven years to support the salary, direct research costs, small equipment, and indirect costs of the chairholder and their research teams.

The Phase 1 Process

Chairs were identified through a two-stage process. In Phase 1, universities competed to have their Chair proposals among the 40 to be advanced to Phase 2. In Phase 2 of the competition, universities then nominated a proposed nominee to compete for their Chair.

Phase 1 applications consisted of a description of the university's plans to establish a CERC. Proposals had to outline the university's past and planned commitments in the proposed research area, its existing institutional strengths, future research directions, expected research outcomes, and the plans to sustain the beneficial impact of the chair on the related research at the university after the seven year period for the Chair ends. In addition, all Chairs were to be awarded within the four research priority areas set out in the S&T Strategy. No fewer than six proposals from Phase 1 were to be retained for each priority area, and then in Phase 2 no fewer than three Chairs were to be allocated to each of the priority areas. In addition, for the first competition, at least one Chair was to be allocated to a research area of direct benefit to the automotive industry, and chair proposals that address one or more of the sub-priorities identified by the Science, Technology and Innovation Council (STIC) were to receive higher ranking in the assessment and selection process (see panel opposite for the STIC sub-priorities). In future competitions, the government may refresh program priority areas to ensure they are consistent with federal S&T objectives at that time.

The applications also included estimates of how the CERC funds would be used, as well as potential for leveraged funding. Universities were not asked to identify a nominee at this stage. Universities were encouraged to submit applications in areas: where they had existing research strength; where they already showed global leadership; and which aligned with the four S&T priority research areas.

During information sessions for the Program, a key concern expressed by participating universities was the short timeframe available to pull together the Phase 1 application, and then to recruit the proposed nominee in Phase 2. In response to these concerns, the deadline for Phase 1 was moved from November 28, 2008 to December 8, 2008, and the Phase 2 deadline was moved from August 2009 to November 16, 2009. Another concern raised by universities during the process was that the 50% odds of being successful in Phase 2 would make it more difficult to recruit top candidates. It was felt that some top candidates would hesitate to commit to a process only with a 50 % chance of success.

By the Phase 1 deadline of December 8, 2008, 135 applications were received from 41 universities, competing to be one of the 40 proposals to be shortlisted for Phase 2. The 135 Phase 1 proposals were evaluated in three stages. First, international review panels assessed each application to be considered by the Selection Board. The mandate of the Selection Board in turn was to use the input from the review panels and their own judgment to create a recommended short-list of up to 40 applications that met the expectations of excellence set out for the program and had the highest potential to be strong, strategic investments in research excellence in Canada. As noted, in order to ensure the program met its objectives for S&T priority areas, the Selection Board was required to recommend a minimum of six applications in each priority research area for advancement to Phase 2, give preference to proposals supporting the STIC sub-priorities, and also select one or more applications in research areas of direct benefit to the automotive sector. The Selection Board met on March 27, 2009, and recommended 40 applications for advancement to Phase 2.

The Program's Steering Committee (comprised of the Deputy Minister of Industry and the Presidents of the three granting councils, with the President of the Canada Foundation for Innovation as an observer) then met on April 7, 2009, and reviewed the evaluation process used for Phase 1 applications to ensure that it was consistent with the agreed process and was rigorous, objective, and transparent. After this review, the Steering Committee approved the recommendations of the Selection Board. Participating institutions were then advised of the Phase I results on April 8, 2009.

The Phase 2 Process

In Phase 2, universities were required to nominate a proposed candidate for each of their successful proposals from Phase 1 to compete for one of the 20 Chairs. The nomination for Phase 2 consisted of information on the nominee and their scientific contributions, a detailed description of the proposed program of research (objectives, methodology, proposed training strategies, proposed plans for communicating research results), a detailed budget, and a description of the integration with the Phase 1 application. The nomination was also required to be accompanied by two letters of reference and letters of confirmation of support for all leveraged funds cited in the budget.

Box 1. Federal S&T Strategy's four priorities:

Environmental science and technologies

STIC Sub-priorities: Water (health, energy, security); cleaner methods of extracting, processing and using hydrocarbon fuels, including reduced consumption of these fuels.

Natural resources and energy

STIC Sub-priorities: Energy production in the oil sands; Arctic (resource production, climate change adaptation, monitoring); bio-fuels, fuel cells and nuclear energy.

Health and related life sciences and technologies

STIC Sub-priorities: Regenerative medicine; neuroscience; health in an aging population; biomedical engineering and medical technologies.

Information and communications technologies

STIC Sub-priorities: New media, animation and games; wireless networks and services; broadband networks; telecom equipment.

Nominees for Chairs were required to be full professors or associate professors who were expected to be promoted to the full professor level within one or two years. Alternatively, if they came from outside the academic sector, nominees had to possess the necessary qualifications to be appointed at these levels. The Program imposed no restrictions on nominees with regard to nationality or country of residence. However, researchers already at a Canadian university were not eligible for Chairs at their current university.

A requirement for Phase 2 was that universities use an open and transparent process to recruit and nominate their CERC candidate. In particular, universities had to advertise their CERC position with a statement of commitment to equity in the selection process and consider all eligible applicants when identifying their nominee. A senior university representative had to attest, on the nomination form (which was provided under separate cover), that the process used to recruit and nominate the CERC candidate was transparent and equitable, and conformed to the guidelines established for the program.

The deadline for nominations was November 16, 2009. Thirty-six of a possible 40 nominations were received. **All 36 candidates proposed by the universities were male.**

As with Phase 1, the review of Phase 2 nominations involved a multi-step process: peer review by external reviewers and an international review panel; interviews of the universities by the Review Panel; strategic evaluation by the Selection Board, including meeting the S&T priority-area requirements; and overall review and assessment of the evaluation process by the program's Steering Committee. On January 30, 2010, the Selection Board recommended the 20 top nominees for approval and ranked four other qualified nominees in case any of the top 20 did not accept the award. The Program's Steering Committee met on February 11, 2010, reviewed the entire process used for Phase 2 to ensure it was consistent with the approved process and was rigorous, objective, and transparent, and approved the top 20 nominees and the additional four proposals as back-up candidates, should any of the 20 fall through.

On February 12, successful universities were contacted and informed of the embargoed competition results, and then sent Notices Of Award and Acceptance (NOAA) on February 16, to be signed by their nominees, who had three weeks to accept the award (where any of the top 20 candidates declined the award, universities with individuals on the

Box 2. Timeline

September 2, 2008 the Program launched by Minister of Industry in Toronto, program web site with application and program materials goes live.

Deadline for Phase 1 extended from November 28, 2008 to December 8, 2008, and the Phase 2 deadline from August 2009 to November 16, 2009, in response to university concerns that the process was being rushed.

January 2009: Phase 1 review panels met for two days in Montreal. Selection Board met on March 27, 2009, and the Steering Committee met on April 7, 2009.

April 8, 2008: Universities were advised of the Phase 1 results, which were publicly announced on April 23, 2009.

June/July 2009: Phase 2 information sessions.

November 16, 2009: deadline for candidate nominations for Phase 2.

January 2010: Review Panels met. The Selection Board met on January 30, 2010, in Ottawa. The Program's Steering Committee met in Ottawa on February 11, 2010.

February 12, 2010: successful universities were told of embargoed competition results.

On February 16, the Program sent Notices Of Award and Acceptance (NOAAs) to universities for the top 20 candidates, who were given three weeks to sign their acceptance of the award.

reversion list were contacted and, in turn, had three weeks to have the nominee sign the NOAA). A total of 19 Chairs were accepted by the candidates.

Observations

Foremost, the absence of female recipients was not a result of active choices made during the formal review processes of the program by the Review Panel, Selection Board, or Steering Committee. In Phase 1, the evaluation of proposals was made in the absence of any knowledge about the potential candidates. In Phase 2, no female candidates were submitted by universities as nominees for consideration. Secondly, the CERC Program design required that universities use an open and transparent process to recruit and nominate their CERC candidate, advertise their CERC position with a statement of commitment to equity and diversity in the selection process, and attest at a senior level on the nomination form that the process used to recruit and nominate the CERC candidate was transparent and equitable.

For these reasons, understanding the absence of female researchers in the CERC Program requires consideration of the wider university talent pool and context, and the interplay of aspects of the CERC Program and rules with that context. Section 3 examines the university talent pool and context with respect to gender and researchers.

Several aspects of the CERC Program design that may be relevant to the gender outcome include: the Program focus on the international cadre of the most senior international researchers; focus on the S&T Strategy’s four priority research areas and the STIC sub-priorities; and the CERC program’s compressed program timelines. Finally, the uncertainty of the outcome of the Program for candidates being nominated, and the possible reputational and planning risk it entailed is also an important factor for consideration. These areas are examined in section 5 in the discussion of the recommendations.

3. The University Context

As set out in Table 1, the successful candidates were drawn from six OECD countries, with 17 of the 20 coming from the United States, the United Kingdom, Germany, and France.

Table 1: Countries from which 19 CERC Program candidates were selected.

Current country of employment	Number of CERC recipients
1. United States	9
2. United Kingdom	4
3. France	2
4. Germany	2
5. Brazil	1
6. Greenland/Denmark	1

In these six countries, the smaller part of the university faculties are female. Although international data comparisons are often indicative rather than authoritative - given differences in data collection and approaches - in general terms females represent 43% of faculty in the United Kingdom, 36% in France, 33% in Canada, 33% in the United States, and 32% in Germany (data varies by country over 2003-2007 years, comparable data for Denmark and Brazil is not available).

Furthermore, the CERC Program targeted senior researchers, with eligible nominees required to be, or soon to be, full professors. Of the 19 CERC recipients, nine were recruited from the United States. In the United States in 2006, only 19% of full professors were female, while 34% of the CERC feeder-pool of associate professors was female. If evidence in Canada is comparable to these OECD countries, many of these female faculty members who would potentially be nominees for the CERC Program will have reached senior levels comparatively recently. In Canada, the proportion of full professors who are female was 4% in 1960-61, 3% in 1970-71, 5% in 1980-81, 8% in 1990-91, 15% in 2000-01, and 20% by 2006-07. As a group, female faculty may be comparatively younger and less well-established than male researchers at the same faculty level. However, in time the larger proportion of female associate professors may be expected to advance to full professorships, increasing the proportion of full professors who are female.

At the same time, system-wide data can overstate the female talent pool available, as the proportion of faculty who are female varies widely by research discipline or field. As noted, nine of the CERC recipients were recruited from the United States. In the United States, the proportion of faculty who are female ranges from 65% in Health, 54% in Psychology, and 36% in Social Sciences, to 22% in Computer and Information Sciences, 18% in Physical Sciences, and 12% in Engineering.

Table 2: U.S. Female Employed Doctorates, by field: 2006.

Field	% Female
All fields	32.6
Science	33.3
Biological, agricultural, and environmental life sciences	34.1
Computer and information sciences	21.7
Mathematics and statistics	19.0
Physical sciences	18.0
Psychology	53.9
Social sciences	35.7
Engineering	12.1
Health	64.8

National Science Foundation/Division of Science Resources Statistics, Survey of Doctorate Recipients: 2006.

While the categories tracked by U.S. and Canadian statistical agencies differ, Canadian data (Table 3) also indicates that the proportion of full professors who are female varies across disciplines, from a high of 38% in Education to a low of 7% in Engineering and Applied Sciences, although the associate professor cadre indicates this will change in time.

Table 3: Proportion of Canadian Female Full and Associate Professors, by field: 2006-07.

Field	Full	Associate
Total	20%	36%
Education	38%	52%
Fine and Applied Arts	30%	44%
Humanities and Related	27%	43%
Social Sciences and Related	23%	37%
Agricultural and Biological Sciences	19%	32%
Engineering and Applied Sciences	7%	12%
Health Professions and Occupations	22%	44%
Mathematics and the Physical Sciences	9%	17%
Not Reported	18%	26%

Statistics Canada, Centre for Education Statistics, 2006-07 data.

Although the CERC Program did not specify which disciplines or fields of research were eligible for consideration for Chairs, the Program required that proposals be within the four priority research areas set out in the federal S&T Strategy, and gave an advantage in the evaluation process to proposals in the sub-priority areas identified by STIC (see Box 1). While these priority and sub-priority areas do not equate to research fields, the successful projects funded through the CERC program in Table 4 suggests they arguably lean toward bio-medical sciences, natural sciences, and engineering, and away from humanities, social sciences and health occupation disciplines – areas where a larger proportion of faculty are female.

Table 4: Successful CERC chairs by discipline.

Priority Area -- Environmental Science and Technologies : 5 Chairs	
<i>Primary discipline</i>	<i>Secondary discipline</i>
Population Health - General	Infectious Diseases
Multidisciplinary in Natural Sciences and Engineering	Hydrology
Oceanography	Environmental Engineering
Hydrology	Evolution and Ecology
Electrical/Electronic Engineering	Mechanical Engineering
Priority Area -- Natural Resources and Energy : 4 Chairs	
<i>Primary discipline</i>	<i>Secondary discipline</i>
Oceanography	Other – NSE
Earth Science	Geochemistry/Geochronology
Microbiology	Biochemistry
Chemical Engineering	Physics

Table 4 continued: Successful CERC chairs by discipline.

Priority Area -- Health and Related Life Sciences and Technologies : 6 Chairs	
<i>Primary discipline</i>	<i>Secondary discipline</i>
Biochemistry	Molecular Biology
Infectious and Parasitic Diseases	Pharmaceutical
Life Sciences Related to Human Health	Mental/Behavioural Disorders
Molecular Biology	Cell Biology
Mental and Behavioural Disorders	Central Nervous System
Diabetes Mellitus	Metabolism and Nutrition
Priority Area -- Information and Communication Technologies : 4 Chairs	
<i>Primary discipline</i>	<i>Secondary discipline</i>
Physics	Multidisciplinary in NSE
Physical Chemistry	Physics
Physics	Information Technology
Materials Science and Technology	Physical Chemistry

The summary statistics discussed in this section are intended to be illustrative only, and to make the general point that there are fewer female faculty, that the proportion of female faculty declines with seniority, and that the proportion of female faculty also varies widely by discipline. For an initiative such as the CERC Program, which is intended for world-leading researchers and targeted on the four S&T Strategy priority research areas and the STIC sub-priorities, the implication is that the talent pool of female researchers will be much smaller than perhaps anticipated.

Strategies to address this in the CERC program are discussed in Section 5. However, given the importance of the inclusion of female researchers in Canadian research activity, a much more thorough examination of these issues and the related statistics is recommended. This in-depth review would aid with understanding the complex factors that may underlie the comparatively lower level of senior researchers who are female, and increase the success of federal programs in more effectively supporting the needs of female university researchers in Canada.

Recent U.S. Analysis

Analysis of the advancement of women in university research has recently been undertaken in the United States. This analysis suggests factors which also could have influenced the outcome of the inaugural CERC Program competition in the event the same factors are present in Canada. In 2006, the U.S. National Academies released *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering*. This analysis failed to find any differences in the ability, training, or research productivity of women that would explain differences in their career progression. Instead, the Panel members noted the interaction of factors such as psychosocial features, family patterns, institutional requirements, and aspirations and expectations produced unequal career outcomes for men and women. Of particular interest to the work of this CERC Gender Panel was their finding that:

“Various institutions of society — including family, schools, and employers — interact to create obstacles to women’s careers. **Those interactions strongly influence the differential choices that men and women make at crucial points along their educational and career progressions**” [pg. 161].

Factors noted in the U.S. report that seem relevant for the CERC Program and warrant more consideration include: that married women who have children are 50% less likely to gain faculty positions; and that having children decreases the likelihood of women obtaining a tenure-track job by 8% to 10% in all science and engineering fields, but has no significant impact on men. Recruitment strategies that merely stated that women and minority-group members are encouraged to apply resulted in low success rates in hiring women. Narrow position specifications reduced the numbers of women hired and advanced, as women work more frequently in multidisciplinary areas. Successful academics relocate throughout their training and career, yet women academics are less mobile as women are more often in dual-career marriages (80% of women mathematicians and 33% of women chemists are married to men in their fields), and women’s mobility is much more constrained by the presence of children (women with elementary school-age children are 39% less likely to move).

These factors may have been aggravated by aspects of the CERC Program design. For instance, the formal requirement that universities advertise their CERC position with a statement of commitment to equity may be insufficient, and more proactive measures may be required to engage female researchers. Female candidates with family obligations may have been discouraged from advancing themselves for consideration due to the compressed timelines of the program, and the 50% chance of failure in Phase 2. The combination of compressed timelines and risk would have made planning family relocation both more difficult and uncertain. Section 5 of the report examines possible changes to the design of the CERC Program that could mitigate these factors, and also address the statistical profile of the female research community.

Similar Programs and Gender

A closely related initiative to the CERC Program is the Canada Research Chairs (CRC) Program. This program provides universities with \$200,000 annually for seven years for world leading researchers (“Tier 1”), and \$100,000 annually for five years for researchers who have the potential to be world-leaders in their fields (“Tier 2”). In total, the CRC Program provides up to \$300M annually for up to 2000 research Chairs.

Equity and diversity considerations arose early in the CRC Program. With respect to gender, the proportion of women being nominated was significantly lower than the proportion of women on faculty. In 2006, a settlement was negotiated to a human rights complaint. The settlement agreement required the CRC Program to take on:

- collecting data on the status of Chair nominees in terms of membership in four designated groups;
- instructing universities to set targets for the representation of members of the four protected groups in Canada Research Chairs;
- ensuring that transparent, open and equitable processes are employed in the recruitment and nomination of Chairs; and

- establishing a process to provide recognition to universities with exemplary equity practices in recruiting, nominating and/or appointing Chairs and meeting equity targets.

The proportion of female program chairholders has now risen to roughly 25% of the program total (<http://www.chairs-chaieres.gc.ca>). Active measures to encourage universities to proactively engage the female research community seems to have played a key role in this change.

Canada is not alone in its interest to attract and retain the brightest minds in support of building science and technology and innovation capacity; there are a range of programs with similar objectives internationally. From information on their websites, some of these programs indicate challenges in achieving gender balance, such as Les Chaires de recherche Blaise Pascal in France, or the Federation Fellowships in Australia.

In addition, while not “Chair” programs per se, European Research Council (ERC) programming provides substantial funding to individuals for multi-year projects, and seems to have had more success to date in supporting female researchers through using a two-stream approach. The ERC Advanced Investigator Grant (up to €3.5M over 5 years) supports researchers who have established themselves as research leaders, while the ERC Starting Independent Researcher Grant (up to €2M over five years) targets high-promise young investigators who obtained their PhD less than ten years prior to the start of the competition. Both programs support health, physical science and engineering, and social science research. The average age of Advanced Grant recipients was 51 and the proportion of recipients who are female was 15%. In contrast, the average age of Starting Grant recipients was 36, and 23% of recipients were female. By differentiating older established researchers from emerging researchers, this two-track approach seems to have better engaged female researchers.

4. Conclusion

In support of formulating advice to the Minister of Industry regarding changes to the CERC Program that would improve gender representation, the Panel members reviewed the CERC Program process, the context for female faculty in the countries from which the successful CERC candidates were recruited as well as Canada, some recent analysis conducted in the United States, and domestic and international programs similar to the CERC Program.

The review of the inaugural CERC competition process highlighted a few aspects of the Program which may have impacted the ability of the universities to find and enlist female candidates, including: the its focus on the most senior international researchers; its focus on the S&T Strategy’s four priority research areas and the STIC sub-priorities; its compressed program timelines; and uncertainty of the outcome of the Program for candidates being nominated.

These factors are important due to the context for the female researcher community. A preliminary examination of the university context underlined the reality that — despite gains in recent decades— there are fewer female faculty to begin with, the proportion of female faculty declines with seniority, and the proportion of female faculty also varies widely by discipline. As a result, a program that intends to engage the talents and contributions of the female research community has to effectively connect with this smaller community. In this context, recent work in the United States noted approaches that can favourably influence the participation of women in research programs of this nature. Examples

include the need for proactive outreach and, given the family change and relocation required of the Program, avoidance of program features that compress timelines and/or increase risk in decision-making related to participation.

Examples of similar programs reinforce this: the Canada Research Chairs Program achieved a more appropriate proportion of female participants after instigating measures that encourage more proactive university engagement on gender balance. The European Research Council seems to have succeeded in improving the participation of female researchers through establishing a two-stream program approach that differentiates younger researchers from older (predominately male) researchers, without sacrificing the overarching imperative of encouraging excellence in research.

For this reason, the following section offers recommendations for changes to the CERC Program design. The recommendations are intended to sustain its success in attracting world-leading research talent and building critical mass in the federal S&T Strategy research priority areas, while ensuring that the Program successfully engages the talents and contributions of the world's leading female researchers.

5. Discussion of the Proposed Recommendations

In response to the foregoing discussion of the CERC Program process and wider university context, the Panel has identified five recommendations for consideration. This section sets out each of the proposed recommendations and their supporting rationales.

a. That the Program application process require universities to report on their proactive outreach to potential female candidates, covering the period from the very beginning of their recruitment process through to final selection of their nominee.

As noted, a requirement for Phase 2 of the CERC Program Competition was that universities use an open and transparent process to recruit and nominate their CERC candidate. Universities had to advertise their CERC position with a statement of commitment to equity and diversity in the selection process and consider all eligible applicants when identifying their nominee. A senior university representative had to attest, on the nomination form (which was provided under separate cover) that the process used to recruit and nominate the CERC candidate was transparent and equitable.

From the site visit interviews, it was apparent that some universities had used informal processes to identify the initial pool of candidates to be encouraged to enter the formal university recruitment process. These informal outreach processes may have involved senior researchers identifying potential nominees from among their international peers. Given the lower representation of women in the community of senior researchers, use of these informal networks at the outset of the process may have inadvertently introduced a bias in the pool of potential candidates entering the more formal university selection process. At the same time, it is not clear that universities used proactive measures specially targeted at engaging and recruiting potential female researchers to participate in their candidate selection processes.

Requiring universities to undertake and report on proactive outreach activities to identify female candidates from the very beginning of the recruitment process would instill consideration of gender from the outset. As there is a growing effort among OECD countries to attract and retain the best and

brightest minds, and given the smaller numbers of senior female researchers, this will be an important contribution to the success of the Program going forward.

b. That the CERC Program design be changed to create two program evaluation “streams” within the competition process: (i) one for rising stars, and (ii) one for established leaders.

The CERC Program materials reviewed by the Panel indicate that the Program is designed to (i) attract the world's most accomplished minds and to (ii) help Canada build a critical mass of expertise in four strategic priority research areas.

Reflecting this, evidence from the inaugural CERC Program competition suggests that different universities took different approaches to the kind of candidates that they were proposing. Candidates ranged from older, very senior researchers, to younger, capacity-building candidates who, while less senior, had already clearly demonstrated superior accomplishments and made transformative contributions to their field.

The achievements of rising stars are comparable in quality but normally not as numerous as those of established leaders. Therefore, comparing the two sets of candidates in the same competition process favoured the more senior candidates overall. The proportion of female faculty decreases at the more senior levels, which results in a reduction of the number of women awardees. A two-track evaluation process within the Program design would result in a larger proportion of the awards going to female researchers, while still delivering on the excellence objectives of the CERC Program. It would also reflect a “portfolio” approach, in which the CERC Program supports Chairs across several priority and sub-priority areas and across various age and experience levels. Additionally, it would attract leading established researchers entering the mentoring and guiding stage of their career and new talent at the front end of their personal research agendas and careers.

Consideration should also be given to the measurement of excellence, as reliance on traditional bibliometrics such as publications and citations may limit the assessment of the contribution of researchers who have had significant policy, commercial innovation, or other impacts.

c. That the CERC program design be changed so that: Phase 1 of the Program no longer short-lists more Chair proposals than there are funded Chairs available in Phase 2; or alternately, that the number of Chair proposal advanced to Phase 2 be closer to the number of available Chairs.

The inaugural CERC Program design consisted of two phases. In Phase 1, Canadian universities submitted proposals for chairs to be awarded to their institution. In Phase 2, the short-listed successful universities submitted their proposed researchers to then compete to be awarded a Chair. While only 19 Chairs were ultimately awarded in Phase 2, a total of 36 proposals were short-listed in Phase 1, creating an almost 50% chance of failure for candidates who agreed to have themselves put forward.

Consultations during the inaugural competition process indicated that universities found the program timeframes too hurried, and that the 50% odds of being successful in Phase 2 created detrimental uncertainty which could impede recruitment of top candidates.

Both the perceived rush of the program's timelines, and the uncertainty of the Program's outcome between Phase 1 and 2, may be particularly important with respect to gender considerations. While overall societal changes continue apace, evidence suggests that due to the interaction of factors such as family patterns, institutional requirements, and career expectations, women may be particularly vulnerable to factors such as compressed timelines, risk in career change, and changes in location of residence. A perception of short program timelines, and the risk that even after committed to the process a proposal may not succeed, may have played a limiting role on female participation in the Program.

While the Program timelines were extended during the inaugural competition in response to the first concern, the uncertainty of outcome arising from the 50% success rate in Phase 2 remains. Decreasing or removing this uncertainty may improve female participation rates in the program.

d. In the event that the CERC Program uses priority and sub-priority areas, greater emphasis should be placed on ensuring multidisciplinary approaches and consideration should be given to having an "open" category for projects outside of the identified priority areas for the competition.

Given the CERC Program's objective of attracting the world's best researchers in priority research areas that are expected to generate social and economic benefits for Canadians, the inaugural CERC Program competition awarded the 19 Chairs within the four research priority areas set out in the federal S&T Strategy. In addition, priority was given to proposals that addressed one or more sub-priority areas identified by the Science, Technology and Innovation Council (STIC) and for a Chair benefiting the automotive industry. While it is not clear that these exact same priority-areas will be used to guide subsequent CERC Program competitions (the priority and sub-priority research areas may be reviewed to ensure they are consistent with wider government S&T priorities), targeted areas may continue to be used to guide the program and federal S&T investments.

As noted in the discussion above, the priority areas targeted by the Program will have gender impacts, as the proportion of women researchers varies greatly among disciplines and research fields. The priority and sub-priority areas used in the inaugural CERC Program competition may have had the effect of greatly diminishing the proportion of potential women candidates due to the gender mix of the disciplines involved (which, when combined with the impact of fewer women at more senior academic levels, resulted in a more limited pool of potential female candidates than male candidates).

For this reason, future CERC Program competitions may wish to consider the gender impact of the priority and sub-priority areas targeted, placing greater emphasis on multidisciplinary research addressing the priority areas, and giving consideration to allowing a few investments to fall outside the priority categories, where they are clearly to Canada's strategic interests, through having an "open" category for a few projects. Given the benefits of targeting investments in priority areas important to Canada, and the policy intent of the Program to build capacity in these areas, it is recommended that the number of chairs in the "open" category be limited in number. Lastly, care is required to develop well-defined definitions of the priority and sub-priority areas to be used in the Program to aid the review process.

e. That the Council of Canadian Academies be charged with undertaking an assessment of the advancement of women in university research careers in Canada.

No female candidates were submitted by universities to the inaugural CERC Program competition. For this reason, the work of the Ad Hoc Panel had to extend outward from a review of the design and delivery of the CERC Program to issues of gender within the wider university context.

However, by its nature, this ad hoc review is not sufficient to consider wider issues in the university community. We therefore recommend a more thorough assessment by a third-party body, such as the Council of Canadian Academies, of the data and issues around the advancement of women in Canadian university research.

An in-depth review would aid with understanding the complex factors that underlie the comparatively lower level of senior researchers who are female, increase the success of federal programs in supporting their needs and development, and engage their talent, expertise and ideas for the betterment of Canada and the world. Given the demographic challenges of our projected aging workforce, the need to ensure the full contribution of everyone is not only an equity imperative, but also a pragmatic reality.