

2019

AIEA Annual Conference

*What's Next?
Possibilities and Probabilities
in the Future of International
Higher Education*



Sustainable Cooperation with Brazil Post Science Without Borders

Adel El Zaïm, University of Ottawa

Leandro Russovski Tessler, Universidad Estadual de Campinas

Margot N. Gill, Harvard University

Peter Mascher, McMaster University

Agenda

- Introduction
- Leandro Russovski Tessler joined Instituto de Física, Unicamp in 1991, where he is Associate Professor since 1999. He is author or coauthor of more than 60 research papers and 6 book chapters. At Unicamp, Leandro was Dean of Admissions (2003-2009) and Director of International Relations (2009-12). He chaired 5 FAUBAI Conferences. He is currently member of CAPES Internationalization Advisory Group. His Research interests include rare-earth doped nanostructured semiconductors and internationalization of higher education. He holds a Ph.D. from Tel Aviv University, obtained in 1989.
- Margot N. Gill is the Administrative Dean for International Affairs in the Faculty of Arts and Sciences at Harvard University. She held multiple positions in the Graduate School. She currently chairs the University's Committee on General Scholarships and oversees agreements and government relationships throughout Latin America, Asia, Europe, Canada, Australia, and New Zealand. Her academic area of interest is African archaeology. She completed her MA and PhD degrees
- Peter Mascher obtained a PhD in Engineering Physics in 1984 from the Graz University of Technology (TUG). He joined McMaster University's Department of Engineering Physics in 1989. He is a Fellow of the Canadian Academy of Engineering and the Electrochemical Society. In 2015 he was appointed as an Honorary Professor at Nanjing Tech University. Since February 2014 he is McMaster's Vice Provost, International Affairs. Mascher holds the William Sinclair Chair in Optoelectronics.

- Q&A

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Learning from the field: from SwB to Print

Leandro Russovski Tessler, Universidad Estadual de Campinas

Science without Borders

- Largest academic mobility program ever in Brazil
- US\$ 4.5 billion over 4 years
- 101 thousand scholarships
 - 64% undergraduate
 - 20% PhD
 - 6% Young PhDs
 - 6% Technical
 - 4% Foreign scholars
- STEM + Medical
- Foreign agencies did student placement
- Tuition fees fully payed
- Focus on mobility
- Languages without Borders
- Started in 2011
- Suspended in 2015
- Terminated in 2017

Criticism to SwB

- Fuzzy objectives
 - Impossible to objectively evaluate the program
- Focus on undergraduate mobility
- Language issues
- Almost no research cooperation involved
- Low standards
- Top Brazilian universities had no influence on destination of its students
- High cost
- Student accountability
- Credit recognition
- Funding by the private sector (25%) never materialized
- Very modest attraction of foreign talent
- **Sustainability**

(Lack of) Impact of SwB

- **Visibility of Brazilian HE**
 - **Very low rate of credit recognition for undergraduates**
- **Brazil finally recognized the importance of English for internationalization of HE**
 - **No effect on Brazilian STEM curricula**
- **Internationalization of vocational education**
 - **Lack of follow-up**
- **Brazil became perceived as a consumer of HE services**
 - **Little effect on scientific cooperation**

Programa Institucional de Internacionalização – Print - CAPES

- Strategic institutional planning
- Networking
- US\$ 75 million over 4 years
- 36 projects approved
- Research cooperation
- Research outcomes
 - Papers
 - Patents
- Mainly graduate and faculty mobility
 - No funds for tuition or bench fees
- Partners are expected to co-fund the projects
- Institutional accountability
 - Management Group
 - Intermediate evaluations

To take home

- SwB is over
- Brazil has world class research infrastructure in many areas
- Cooperation with Brazil
 - Research based
 - Graduate students
 - Co-funding
- Focus on two-way roads
- Strategic partnerships
- Innovative programs
- Sustainability
- New calls for PrInt?

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Harvard's Sustainable Cooperation with Brazil Post Science Without Borders

Dr. Margot N. Gill, Harvard University



Overview

- Harvard–Brazil by the Numbers
- Build on Existing Research Collaborations
- Assess the Harvard–CAPES Agreement: Challenges and Opportunities
- Questions and Discussion



Harvard-Brazil by the Numbers

Brazilian Students, Scholars, and Alumni

107 Brazilian students

19 Undergraduates

9 PhDs

156 post-doctoral scholars

1,604 Harvard alumni residing in Brazil

Student Activity

- Undergraduate Summer Research Internships
- Clubes de Ciencia Brazil (5 clubs, 10 instructors, 100 students)
- Student Association Brazil Conference



Brazil Conference

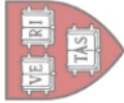


Harvard Faculty Partnerships in Brazil

DRCLAS Sao Paulo Office and the Brazil Studies Committee - established in 2006 to facilitate partnerships in Brazil.

Examples

- **Harvard-Brazil Cities Research Program** – public health, engineering, air pollution, ecological urbanism.
- **Laboratory Research Collaboration – FMUSP Universidad de Sao Paulo**
Medical School students conduct research on the cardiopulmonary effects of air pollution, pollution models, cardiology and learn from labs at Harvard Medical School.
- **Public Health Collaborative Field Courses** – between Harvard School of Public Health, Brazilian host universities and local hospitals, health facilities, NGOs and community-based programs – work on Dengue to Urban Violence.



Harvard Faculty Partnerships in Brazil



Drones over the Amazon

- **Engineering Collaborative Course** – Joint initiative between SEAS and Escola Politecnica da Universidad de Sao Paulo (Poli-USP) – Energy, sanitation, transportation, and water.
- **Climate Research in Amazonia** – Professor Scot Martin collaborating in Manaus with Amazonas State University

Assess Science Without Borders Agreement between Brazil and Harvard

“To Support for Students and Researchers in Science, Engineering, and Technology in the scope of Science Without Borders Program”

Harvard agreement with CAPES and CNPq (2012) to support undergraduates, PhD and MA students, post-doctoral fellows, and medical students.

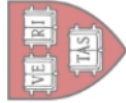
Structure and Funding:

Five-year agreement for Brazilian science students at Harvard. Funding in installments (first installment \$1.65M)

Funds to Support:

- Small number of science undergraduates
- 30 to 40 Brazilian PhD degree students
- 40 post-doctoral researchers
- 25 visiting graduate students to spend a year at SEAS
- 75 Brazilian Medical students for a year of study at the Harvard School of Public

Health



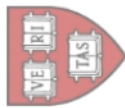
Assess Science Without Borders Agreement between Brazil and Harvard

Challenges

Unrealistic number of students; unstructured program; difficult dual review process; PhD funding pattern and time-to-degree misunderstood, admitted candidates rejected by CAPES; calendars do not align

Opportunities

Re-cast existing agreement – follow general outline and strategic goals of the CAPES-PrInt program. identify partner universities in Brazil.



Questions and Discussion

ONE HARVARD: ONE WORLD



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McMaster University Experience

Peter Mascher, McMaster University

U15

Group of Canadian Research Universities
Regroupement des universités de recherche du Canada

U21 UNIVERSITAS 21

UNITED NATIONS
academic
impact

Sharing
a Culture
of Intellectual
Social
Responsibility



BIOERVATORY
MAGAZINA CHARITÄ UNIVERSITÄT LINZ



UNITED NATIONS
UNIVERSITY
UNU-INWHEH



Pan American
Health
Organization

World Health
Organization
REGIONAL OFFICE FOR THE
Americas

Contact

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McMaster University

World Class Education

- Excellence in educational programs in six Faculties (Business, Engineering, Health Science, Humanities, Sciences, and Social Science)
- Commitment to training Leaders of Tomorrow
- THE Global Teaching Excellence Award Winner 2018

World Class Research

- Canada's most research-intensive university 2017 and 2018
- Research collaborations with partners around the world
- Partnerships with national and international private sector R&D companies

World Ranking

- Top 100, Shanghai JiaoTong Academic World Ranking of Universities 2018
- Top 100, Times Higher Education - World University Rankings 2018
- Top 100, QS Graduate Employability Rankings 2019



Dr. James Orbinski
President of the MSF International Council
1999 Nobel Peace Prize

ENGINEERING PHYSICS ALUMNA '81



DONNA STRICKLAND

BRIGHTER WORLD

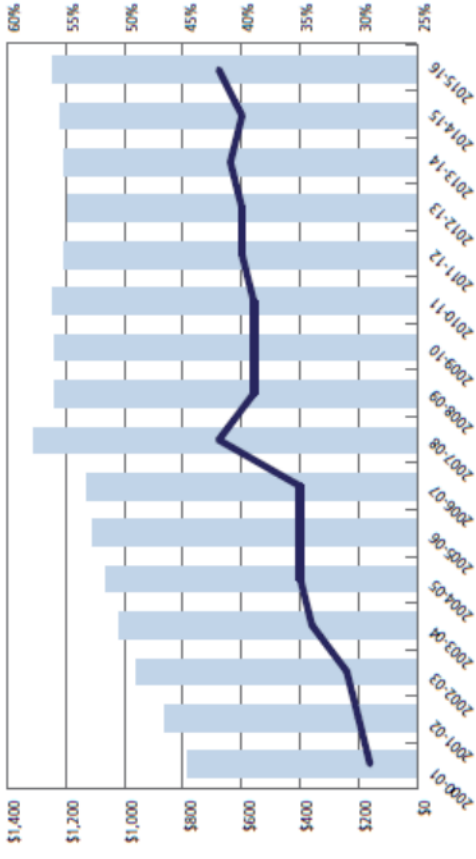
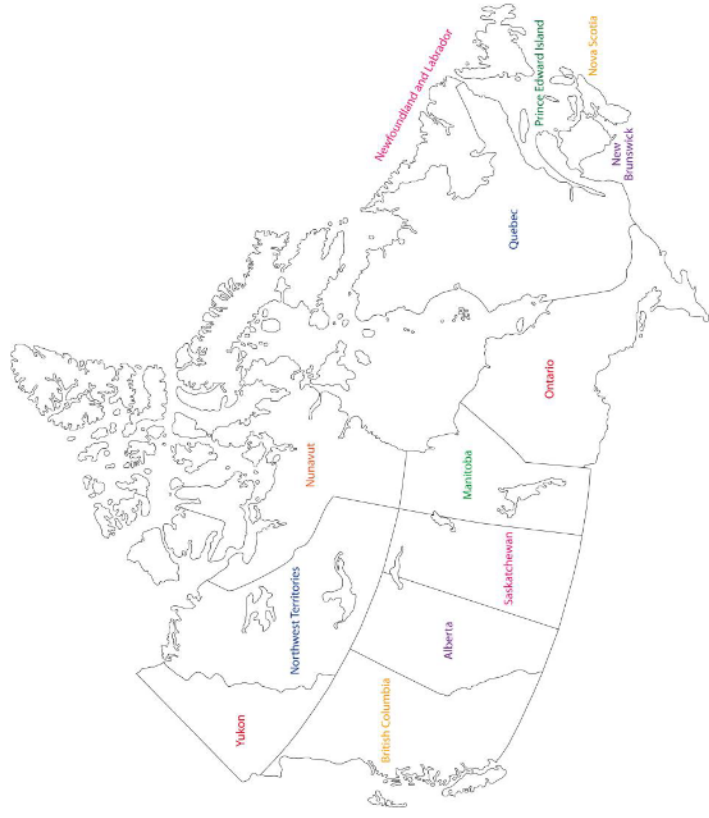
2018 NOBEL PRIZE IN PHYSICS



Bertram Brockhouse
1994 Nobel Prize in Physics

Unique Aspects of the Canadian Education System

- Post-secondary education sector (universities and community colleges) is predominantly a publicly funded system including 98 universities with 1.7 million students (2017 data)
- Education falls under the jurisdiction of the Ministry of Education in each of the Provinces and Territories. All 13 provinces and territories are members of a Council of Ministers of Education
- Universities and Colleges are funded by the Ministry of Education and through the institution's collection of tuition fees



- Federal Government funds research and development at the Universities through three Granting Councils (Canadian Institute of Health Research (CIHR), Natural Sciences and Engineering Research Council of Canada (NSERC) and the Social Sciences and Humanities Research Council (SSHRC))
- University-Industry Partnerships are gaining greater importance – Canada's universities conduct \$1 billion in research for businesses and help build their competitive advantage (2016 data)

Note: total research funding (left axis) is the sum of granting council expenditures on investigator-led and priority-driven research. Source: Computations from the secretariat based on data provided by the granting councils.

Key Observations by the Advisory Panel on Federal Support for Fundamental Science (2017)*

*<http://www.sciencereview.ca/eic/site/059.nsf/eng/home>

- develop critical mass, with sufficient project funds to carry out world-leading research and provide support for clusters and networks;
- participation in international collaborations;
- support for multidisciplinary/trans-disciplinary research;
- focused funding for high-risk research with the potential for high impact; and
- the ability to respond quickly to rapidly emerging research opportunities.



New Frontiers in Research Fund

Fonds Nouvelles frontières en recherche

... an investment of \$275 million over the next five years, and \$65 million per year ongoing, to support research that is international, interdisciplinary, fast-breaking and high-risk... (December 2018)

Plano Plurianual (PPA)

Effective 2016-2019



Strategic Axes:

- quality education for social and economic development;
- social inclusion and reduction of inequalities;
- raise of productivity;
- competitiveness of the economy; and
- strengthening of public institutions with social participation and control

The Canada-Brazil Framework Agreement for Cooperation on Science, Technology and Innovation: Priorities with Respect to Global Challenges



Canada

CANADIAN PROGRAMME
INTERNATIONAL CANADIEN DE
INNOVATION L'INNOVATION À
PROGRAM L'INTERNATIONAL
R&D PARTNERING ABROAD À L'ÉTRANGER
PARTENARIATS EN R-D
À L'ÉTRANGER



- **Life Sciences**, with a particular focus on the development of diagnostic tools, pharmaceuticals and biopharmaceuticals related to *neurodegenerative and infectious diseases*;
- **Ocean Science and Technology**, including *next generation sensor technology and ocean platforms, ocean and coastal observing systems, and data management technologies*;
- **Clean Technology and Green Energy**, with emphasis on *hydroelectric and hydrogen resource development, smart grid, green mining* and the introduction of *nanotechnology for green energy*; and
- **Information and Communication Technology**, focusing on *cloud computing, wireless broadband networks, and gaming technologies*.
- **Nanotechnology**, along with **innovation practices and initiatives**, should be considered as cross-cutting themes to be included wherever possible in the collaborative pursuit of initiatives.

Facilitating the Matching of Brazil's and Canada's Priorities

Cooperative activities may take the following forms:

- Joint research and development activities;
- Pooling of research and development projects, already underway in each Party's territory, into cooperative activities;
- Facilitation of commercially viable research and development activities;
- Organization of scientific seminars, conferences, symposia and workshops, as well as participation of experts in those activities;
- Exchanges and loans of equipment and materials;
- Exchanges of information on practices, laws, regulations and programs relevant to the cooperative activities carried out pursuant to this Agreement;
- Demonstrations of technologies and applications development;
- Visits and exchanges of scientists, technical experts, academics and post-graduate students; and
- Other forms of cooperative activities jointly decided in writing by the Parties.

Key Modalities of the CAPES PrInt Program

- Assistance for Work Missions Abroad (networking and international research collaboration);
- Resources for Project Maintenance;
- International modalities for consideration under the PrInt Program:
 - Ph.D. sandwich (Co-Supervision of Ph.D. students);
 - Junior Visiting Professor (former postdoctoral doctor with employment relationship);
 - Senior Visiting Professor (former senior internship abroad);
 - Training in short courses or "summer / winter schools" (short term research internships)
- Foster in-Country Participation of:
 - Young Talent (junior faculty and researchers);
 - Visiting Professors (encourage joint publications);
 - Post doctoral (expand research and publish internationally)



Programa de Internacionalização
CAPES/PrInt

Opportunities for Sustained McMaster-Brazil Partnerships

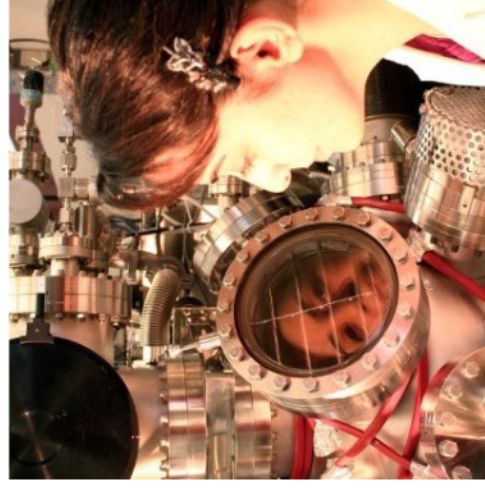
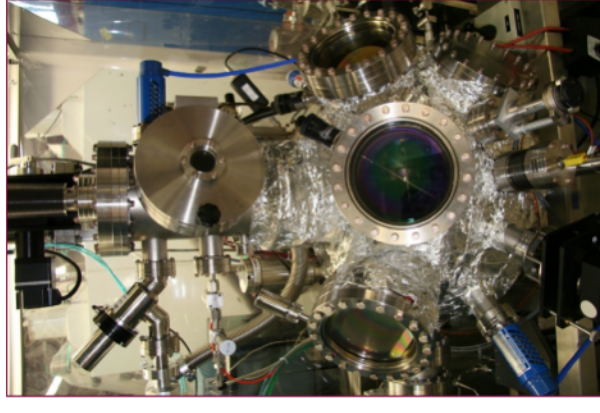
- Co-supervision of Ph.D. students is welcomed and encouraged
- Summer research opportunities available in all areas
- Visiting scholars welcomed
- Encourage joint collaboration with industry (e.g., Vale and steel industry in Hamilton)
- Share infrastructure for research collaboration
- Seek joint funding within Canada (Mitacs, QEII, Tri-Council funding, including non-STEM projects)
- Work with Brazil's State Foundations (FAPESP in Sao Paulo, FAPERJ in Rio de Janeiro)



Research Collaboration between Unicamp and McMaster: A Personal Story



UNICAMP



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journal homepage: www.elsevier.com/locate/jlumin



Excitation mechanism of Tb^{3+} in $a-Si_3N_4:H$ under sub-gap excitation

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ECS Journal of Solid State Science and Technology, 7 (2) N7-N14 (2018)



Influence of Deposition Conditions on the Characteristics of Luminescent Silicon Carbonitride Thin Films

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McMaster Research Priorities

- Addressing the Growing Burden of Chronic Disease
- Advanced Materials and Manufacturing, Industry 4.0
- Aging Across the Life Span
- Big Data, Artificial Intelligence and the Digital Society
- Cognitive and Sensory Neuroscience
- Environment and Energy
- Equitable, Prosperous and Sustainable Societies
- Global Health
- Indigenous Knowledge and Research
- Understanding and Responding to Infectious Disease

BRIGHTER WORLD



DISCUSSION

Q&A

- Please
 - Introduce yourself
 - Mind the time
 - Ask question or share comments