11th Annual Strategic Leaders Global Summit on Graduate Education

Graduate Education 2030: Imagining the Future

September 10-12, 2017
Alyeska Resort, Alaska
United States of America

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2017 Strategic Leaders Global Summit on Graduate Education: Timed Agenda

Sunday, 10 September 2017

Time	Details
18:15	**Assemble in Lobby of Alyeska Resort** **Note:** Map of Alyeska Resort meeting space is available on p. 108
18:30–20:30	**Opening Dinner on the Columbia Patio at Alyeska Resort**

Monday, 11 September 2017

Time	Details
	Breakfast on Your Own **Note:** On-site options include The Pond Café, The Tramway Café, and Room Service.
8:45	**Participant Registration, Columbia B & C, Alyeska Resort** **Note:** All Summit panel sessions will be in Columbia B & C.
9:00–9:15	**Welcome and Introduction**
	Suzanne T. Ortega, President, Council of Graduate Schools
9:15–10:45	**Panel 1: Global and Regional Demographic Shifts**
	Moderator: **Nancy Marcus**, Dean, The Graduate School, Florida State University (U.S.)
	Brenda Brouwer, Vice-Provost and Dean, Graduate Studies, Queen's University (Canada)
	Denise Cuthbert, Dean, School of Graduate Research, Royal Melbourne Institute of Technology University (RMIT) (Australia)
	Nancy Marcus, Dean, The Graduate School, Florida State University (U.S.)
	Shireen Motala, Senior Director, Postgraduate School, University of Johannesburg (South Africa)
	Adham Ramadan, Dean of Graduate Studies, The American University in Cairo (Egypt)
10:45–11:00	**Coffee Break - Columbia Foyer**

11:00–12:30	**Panel 2: Trends in Technology**
	Moderator: **Adham Ramadan**, Dean of Graduate Studies, The American University in Cairo (Egypt)
	Jacqueline Briel, Executive Director, Higher Education Programs, Global Education Division, Educational Testing Service (ETS)
	Luke Georghiou, Vice President, Research and Innovation, University of Manchester (U.K.)
	Joe Luca, Dean, Graduate Research School, Edith Cowan University (Australia)
	Eiríkur Stephensen, Managing Director, Graduate School, University of Iceland - Háskóli Íslands
	Henriëtte Van den Berg, Former Director, Postgraduate School, University of the Free State (South Africa)
12:30–13:30	**Lunch in Columbia A (Alyeska Resort)**
13:30–14:45	**Panel 3: Generational Perspectives**
	Moderator: **Brenda Brouwer**, Vice-Provost and Dean, Graduate Studies, Queen's University (Canada)
	Karen Butler-Purry, Interim Vice President for Research, Texas A&M University (U.S.)
	Mark J.T. Smith, Dean, Graduate School & Senior Vice Provost, Academic Affairs, The University of Texas at Austin (U.S.)
	Lisa Young, Vice Provost and Dean, Graduate Studies, University of Calgary (Canada)
14:45–15:00	**Coffee Break - Columbia Foyer**
15:00–16:30	**Panel 4: Globalization**
	Moderator: **Mark J.T. Smith**, Dean, Graduate School & Senior Vice Provost, Academic Affairs, The University of Texas at Austin (U.S.)
	Philippe-Edwin Bélanger, Director, Graduate and Postdoctoral Studies, Institut National de la Recherche Scientifique, University of Québec (Canada)
	Jani Brouwer, Director, Doctoral College UC, Pontifical Catholic University of Chile
	Mee-Len Chye, Dean, Graduate School, The University of Hong Kong
	Barbara Dooley, Dean of Graduate Studies and Deputy Registrar, University College Dublin (Ireland)
	Jongryn Mo, Dean for International Affairs, Graduate School of International Studies, Yonsei University (South Korea)
16:45	**Assemble for Tram to the Seven Glaciers Restaurant** **Note:** Trams run every 30 minutes and require tickets. We must take the 17:00 tram. Katherine Hazelrigg will have tram tickets for everyone. We also recommend you bring your camera.
17:00	**Tram to the Seven Glaciers Restaurant**
17:30–19:30	**Dinner at Seven Glaciers Restaurant, Alyeska Resort**

Tuesday, 12 September 2017

Time	Details
	Breakfast on Your Own
9:15–10:30	**Panel 5: Workforce Demands**
	Moderator: **Shireen Motala**, Senior Director, Postgraduate School, University of Johannesburg (South Africa)
	Pat Buckley, Dean of Graduate Research, University of South Australia
	Lucy Johnston, Dean, Graduate Studies, The University of Newcastle, Australia
	Susan Porter, Dean and Vice-Provost, Graduate and Postdoctoral Studies, University of British Columbia (Canada)
	Christopher Sindt, Vice Provost, Graduate and Professional Studies, Saint Mary's College of California (U.S.)
	Rachel Spronken-Smith, Dean, Graduate Research School, University of Otago (New Zealand)
10:30–11:00	**Coffee Break - Columbia Foyer**
11:00–12:30	**Panel 6: Conceptualizing the University**
	Moderator: **Denise Cuthbert**, Dean, School of Graduate Research, Royal Melbourne Institute of Technology University (RMIT) (Australia)
	Hans-Joachim Bungartz, Graduate Dean, Technical University of München (Germany)
	Liviu Matei, Provost and Pro-Rector, Central European University (Hungary)
	John Mo, Dean, Graduate School, University of Macau
	Sally Pratt, Vice Provost, Graduate Programs, University of Southern California (U.S.)
	Lesley Wilson, Secretary General, European University Association
	Shinichi Yamamoto, Dean, Graduate Studies, J.F. Oberlin University (Japan)
12:30–13:30	**Lunch in Columbia A (Alyeska Resort)**
14:00–15:15	**Practical Actions**
	Moderator: **Suzanne T. Ortega**, President, Council of Graduate Schools
15:15	**Global Summit Ends**

Welcome and Introduction

Welcome and Introduction

Suzanne T. Ortega
President
Council of Graduate Schools

On behalf of the Council of Graduate Schools (CGS), I am delighted to welcome you to the Eleventh Annual Strategic Leaders Global Summit on Graduate Education. This year, we are honored to co-host the event with our sponsor, the Educational Testing Service (ETS). Thank you to David Payne, Jackie Briel, and ETS for continuing to support this event. As you likely know, ETS is in an excellent position to contribute to our conversation about the future of graduate education given its position as a global research organization and commitment to advancing quality and equity for all students worldwide.

The Strategic Leaders Global Summit: Eleven Years Later
In 2006, CGS and ETS marked the twentieth anniversary of the CGS/GRE Enrollment and Degrees Survey launch with the Graduate Education 2020 project, a program supporting an important international conversation on the future of graduate education. During that same year, CGS and the European University Association (EUA) held a transatlantic dialogue in Salzburg to discuss reforms in doctoral education. That meeting led to the creation of the Strategic Leaders Global Summit, which was expanded to include master's and doctoral education.

In 2007, the first official summit convened in Canada, and I was fortunate to attend as a participant. I was curious to revisit my paper from over a decade ago on definitional and measurement issues related to core competencies that require continued global dialogue, and I was struck by the following:

> [I]n closing, I would like to raise one additional question that I believe universities at large, and the graduate community in particular, must collectively address. The question is simply this: What role does graduate education have and what role should it have in nation building and the reduction of global inequality? This is a tremendously complicated question, one that calls for far reaching economic and sociopolitical analysis. […] Yet it is precisely this kind of question - empirically complex, replete with interpretative ambiguity, but carrying considerable ethical or moral weight - that scholars and scientists, among them our newly minted PhDs and master's students, must strive not only to answer but also help translate into public policy. We owe the next generation our best current thinking and leadership on this issue.

Although written ten years ago, prioritizing access to high-equality graduate education has never been more critical. Universities must continue to broaden their missions to include preparing students to be global citizens, to push the boundaries of current policies of exclusion towards a future of opportunity and inclusion.

In light of the changing global landscape of the past decade, 2017 seemed the perfect opportunity to revisit some of our early thinking on the future of graduate education and to look ahead to 2030. As we think about the next decade, we will reconsider the technological, demographic, and global trends shaping graduate education around the world and address the

global forces transforming graduate education in your countries and regions. How should the nature of graduate education in 2030 differ from what is available in 2017?

Overview of Panels
During the 2017 Global Summit, we will attempt to create a vision of the potential future(s) of graduate education, and how individually and collectively we might help influence these forces for the benefit of students, universities, and broader communities. Panels have been organized around six topics for discussion: global and regional demographic shifts, trends in technology, generational perspectives, globalization, workforce demands, and conceptualizing the university. In no way is this an exhaustive list of themes relevant to the future of graduate education, but these topics provide a framework to begin our conversations.

Over the past decades, we have seen tremendous demographic shifts at global and regional levels. In the U.S., we have witnessed a decrease in the number of married adults, an increase in multigenerational households, and growing racial and ethnic diversity. The generation referred to as millennials (ages 18 to 35) is the largest living cohort in the U.S., and that population is expected to increase through 2036 due to immigration trends.[1] This is particularly significant to the changing workforce in this country. With different learning and leadership styles and a unique relationship to technology, we can expect the next generation to greatly influence graduate education as students, faculty, and administrators. The shift in the nature of work itself towards a project-based structure more reliant on big data requires a new kind of thinking and skill sets in operational management and design.

The differences in generational perspectives have drastically changed due to increased geographic mobility, technological advancements, and a rapid rise in global migration. In a 2016 essay, Michael Dimock, president of Pew Research Center, writes that, "Today more people worldwide live outside their birth countries than ever before – 244 million in 2015, triple the total in 1960. To put that in perspective, if international migrants were a nation of their own, they would make up the world's fifth-largest country."[2] How will these dramatic shifts affect graduate education? Will new advances in technology and the ability to be "virtually" anywhere redefine what we mean by workforce mobility? How will those advances affect our research labs and our delivery models for graduate education? How will the missions of universities change in the wake of these global and social forces?

Final Session and Next Steps
These are challenging questions without definitive answers, but we know these changes are happening. During the final session of the Summit, we will work together to identify action steps to assist our efforts to advance the work of this summit when we return home.

I hope they will reflect the priorities of our varied national and institutional contexts, as well as some common themes of the meeting. CGS will publish the proceedings of this Summit, including your papers and a final document of practical actions, on the CGS website. We will also share it with our approximately 500 member universities in a variety of ways.

I look forward to sharing ideas with this diverse group of leaders in graduate education as we consider Graduate Education 2030 and our many possible futures.

1 Pew Research Center, http://www.pewresearch.org/fact-tank/2017/04/27/10-demographic-trends-shaping-the-u-s-and-the-world-in-2017/
2 Dimock, Michael. (2016, July 5). Global Migration's Rapid Rise. Trend, Summer 2016. http://trend.pewtrusts.org/en/archive/trend-summer-2016/global-migrations-rapid-rise

1: Global and Regional Demographic Shifts

Globalization in Higher Ed: so much more than simply counting international students

Brenda Brouwer
Vice-Provost and Dean, School of Graduate Studies
Queen's University (Canada)

Higher education is a global marketplace and technological advances, innovation and knowledge mobilization are powerful drivers of world economies and societal advancement. As such, it is not surprising that the identification of *internationalization* or *globalization* as a strategic priority is near universal among universities. How it is conceptualized and operationalized institutionally, and how it is measured or demonstrated; however, is much more nuanced taking into account the nature of the university (e.g. research intensive, comprehensive), its aspirations to forge global connections, its academic motivation in forming graduates with international competencies, and relevant external drivers (e.g. government, labour markets).

In Canada, universities view globalization as core to its activities – fundamentally integrated into teaching, research and service functions and ultimately translating into public good, where 'public' extends beyond national borders. In 2014, the Association of Universities and Colleges Canada (now Universities Canada) conducted an Internationalization Survey of its 97 public and private not-for-profit university degree-granting universities to explore the range of institutional practices and priorities.[1] Where possible, data were compared to a similar survey conducted in 2006 revealing considerable advancement in marketing Canadian education abroad to compete for top talent in students and faculty, in commitment and actions supporting global partnerships, and in developing strategic linkages aligning education, trade, and labour market goals. The survey garnered an 80% response rate, of which 82% of respondents view internationalization as one their top 5 strategic priorities; 5 percentage points higher than was the case in 2006. Of particular note is that 72% of institutions reported they were currently engaged in initiatives to internationalize the curriculum compared to only 41% in 2006; with many institutions defining corresponding competency-based learning outcomes. These efforts contribute to 'internationalization at home', an important tactic to produce internationally knowledgeable and interculturally competent graduates in an environment where very few (undergraduate) students (3.1%) participate in an international experience despite a commitment by nearly all universities to provide such opportunities. The creation of scholarships for outgoing student mobility and the integration of activities that develop students' international perspectives are now commonplace in our universities and reflect the centrality of internationalization as core to the academic mission.

The most frequently cited top priority for internationalization in Canadian Universities is recruiting undergraduate foreign students[1] to bring global perspective into the learning environment. Revenue is also a motive for some institutions, though this varies by region and is influenced by provincial government policies. The contribution to the Canadian economy however, is substantial – nearly $8 billion in 2010 and rising as international enrolment

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1   Association of Universities and Colleges Canada (AUCC). Canada's Universities in the World. AUCC International Survey, 2014

grows.[2] Expanding research collaborations and strategic partnerships are next in terms of priority. The impetus here is research prominence and reputation; recognizing that discoveries generally have multinational benefit and value incentivizes collaboration with the worlds' best minds and facilities.[3]

The outcomes upon which internationalization is measured most commonly include the number of international students and the number of countries of origin. Frequent benchmarks are also the number of agreements signed, and the number of publications with foreign co-authors. Based on these metrics Canada is doing well as the number of international students studying in Canada increased 83% between 2008 and 2014[4] and 43% of scientific papers published were co-authored with an international collaborator (the global benchmark is 20%).[1] Graduate education is a key factor in the progress made with growth in international enrolment of almost 78% such that international students account for 24% and over 30% of total full-time enrolment in Master's and PhD programs, respectively.[5] Graduate students contribute not only to the diversification of the learning environment of undergraduate students as mentors and teaching assistants and to the enrichment of graduate education, but they also fuel the research enterprise bringing global perspective and connections.

Canadian competitiveness and prosperity is tightly connected to universities' success in achieving their internationalization goals, which bolster the growing knowledge economy and the development of a highly qualified, globally competitive labour force.[1] Canada needs immigration to compensate for slow population growth and an aging workforce. Attracting top tier graduate students, regardless of nationality has been effective in developing the foundation for a highly skilled workforce. Further, the fact that more than half of international PhD students intend to apply for citizenship[4] suggests that Canada will derive long term benefit from their knowledge, skills and global citizenry that advance the economy and enriches the national social fabric.[6]

Arguably, internationalization cannot simply be evaluated on the basis of performance according to common metrics. Learning outcomes are important and the quantity and quality of institutional effort and commitment are increasingly relevant. Universities must invest in resources and services to enable internationalization including the development of shared services, programs, and supports for faculty, staff and students. As stated at the outset, higher education is a global marketplace and students have many choices. It's not enough to promote diversity and global reputation; a culture of inclusivity that embraces diversity demonstrable through actions and behaviours is essential for tomorrow's international university.[6]

2 Kunin R & Associates. Economic Impact of International Education in Canada – An Update. Report for the Department of Foreign Affairs and International Trade. May, 2012
3 Alberts H. The Globalization of Higher Education. Forbes, July 28, 2010
4 Canadian Bureau for International Education (CBIE). A World of Learning: Performance and Potential in International Education, 2015.
5 Statistics Canada, International Students in Canadian Universities, 2004/2005 to 2013/2014. Catalogue no. 81-599-X – No. 11 ISSN 1709-8653, October, 2016
6 Brouwer B. Why Canada has Become a Destination of Choice for International Graduate Students. University Affairs, May 9, 2017.

Beyond Demographics: The devaluing of expertise, disruption, the uberisation of everything, and other existential threats to graduate research education

Denise Cuthbert
Associate Deputy Vice Chancellor Research Training and Development
RMIT University (Australia)

I am not speaking to the brief in this paper. I have been asked to look at aspects of the shifting demographics of graduate education globally and in my region – the Asia-Pacific – on which there is much to say (the rise of China, flat demand from local students for the PhD, especially in STEM, etc.). However my scan of issues bearing down on the work with which colleagues in this room are centrally concerned indicates that more pressing – possibly existential – threats to our work are gathering force and, to date, I have not seen adequate recognition of these, much less any attempt to counter them.

1. *The repudiation of evidence-based, scientific knowledge and the de-valuation of expertise.*

There is a number of indicators – perhaps most the most obvious of which is the election of Donald Trump as 5th president of the United States in 2016 – which provide evidence of the rise to power and influence of forces antipathetic to science, research, evidence-based argument and approaches to policy, and expertise. While Trump's victory is significant it is not singular. Forces of unreason that are resistant, indeed, hostile to evidence-based argument can be seen at work in the outcome of the British referendum on the EU and other populist/nationalist movements elsewhere. They can also be seen at work in climate-change denialism which thrives well beyond the Trump administration in places like the far right of Australian politics which has generated statements such as "coal is good for humanity" and the challenge to moral courage of "daring to deny [climate change initiated by human activity]".

Underlying and enabling the rise of these forces of unreason is a myriad of factors of which the disenfranchisement of many by the rise of globalisation is one. A further factor which is particularly relevant to the imperilled state of advanced knowledge, central to the mission of universities and graduate schools in particular, is the so-called democratisation of knowledge, and with this, expertise, enabled by the internet and the rise of new digital social media. In this digitally-enabled age, anyone can set up a blog, gather followers and exert influence via twitter, Instagram and other digital platforms which have unprecedented reach and the potential for instantaneous impact. Bunkum, nonsense, unreason and untruth can via the sheer weight of numbers (thousands or tens of thousands of "likes" and "retweets") takes on the appearance of established truth and influence the thinking and actions of many. This sheer weight of numbers appears to have created a new standard of evidence or truth value by which the old ones appear tired and less relevant.

This has now – or may shortly – represents a significant threat to universities. Notably, distrust of higher education, and academic experts, and claims that we run the risk of over-education are part of this complex of ascendant ideas. There is evidence to hand of the de-valuing of expertise as signalled in university education, particularly graduate education, for example one of the big four accounting firms PWC no longer wants graduates and seeks instead to train its own.

2. *The valorisation of disruption and uberisation*

Along with the uncritical adoption of entrepreneurism (which university represented here does not have an incubator/activator facility designed to foster start-ups?) as the new economic panacea, the concept of disruption also holds huge sway in current economic and business discourse. Uber and Air B&B are held up as models of the new way of doing business generating models (graced with the label of the sharing economy) where transportation or accommodation are offered without either stock in cars or buildings, as conventionally understood.

Industries are held to be ripe for disruption where they adhere to business models which are deemed no longer fit for purpose, which carry costs (perhaps related to compliance) which the consumer is no longer prepared to pay, and where a disrupter may offer a different product to meet the same need, or a comparable product in a radically different way and avoid these additional costs and provide consumers with what they want, when they want it.

I would like to suggest that we need to be very alert to the risk of disruption, the uberisation, of higher education. For generations universities have offered degrees and other awards on a more or less unchanged basis – from time to time new degrees have been introduced and from time to time their content and format have changed, but the authority of universities to grant these and their recognition in the labour market have not been challenged. In my view a real and present danger to this way of educating and credentialing presents itself in the form of micro-credentialing and its prospects for stacking these micro-credentials retrospectively to form awards (if not degrees) on a curriculum based either on the learners' needs or the demands of industry. Universities may compete with other providers of micro-credentials in this new marketplace. However, they will always have (or for as long as they seek to support a research mission as well as an education mission) higher costs than other providers. There is a risk that the university will become the equivalent of Hilton Hotels, taxi cabs and large department stores, sidelined by this new business model.

What can be done?

- We need to be better and more persuasive advocates for the education we provide at all levels and especially at doctoral level.
- We need a compelling value proposition for the PhD commensurate with its costs whether these are borne by individual students or the government agencies which fund these studies.
- We need to think hard about both form and content of our degree programs, including our PhDs to ensure that what we consider to be non-negotiable in doctoral education is able to be delivered in (perhaps) new more fexible forms.
- We have to clean up our own back yards and seriously address the problems which tarnish our endeavour: some which spring to mind are poor completion rates, lack of diversity and sexual harassment.
- Our universities need to engage (and be seen to engage) more centrally with the problems besetting the communities we serve and need work with our communities to find solutions.

Demographic Impacts on Graduate Enrollment

Nancy H. Marcus
Dean, The Graduate School
Florida State University (U.S.)

Florida State University is a large public, Research 1 institution located in Tallahassee, Florida. It is one of 12 universities in the Florida State University System. Total enrollment in fall 2016 was approximately 42,000 students, of which 6,880 were graduate students. These numbers represent growth of 22% since the fall of 2000 when 5,645 graduate students were enrolled. The institution offers 81 doctoral degree programs, three professional programs (Law, Medicine, and Nursing), and 155 master's and specialist degree programs.

When I became the Dean in 2005 the university was focused on enhancing its standing as a Research 1 institution. At the same time, the State of Florida expected the state universities to increase both undergraduate and graduate enrollment and established enrollment targets for each institution. The targets for undergraduate and graduate enrollment were respectively, 1% and 2% annual growth, with the goal of increasing the percentage of graduate students overall. As Dean, I encouraged programs to focus this growth on increasing the number of PhD students to align with our designation as a Research 1 institution.

From 2000 to 2016 the total number of doctoral students grew 42% from 1,932 to 2,748. The percentage of doctoral students enrolled full time also grew during this time from 65% and 84%, respectively. From 2000 to 2016 the total number of master's students grew less, rising only 11% from 3,608 to 4,003, and there was little change in the percentage that were part time, 61% vs 62%. To some extent these changes reflect enrollment changes in specific disciplines e.g., decreases in Education, and Public Administration and increases in STEM.

From 2000 to 2016 the percentage of international students grew modestly from 17% to 21%. The actual number of these students grew by 54% from 937 to 1,443. These numbers are small compared to many Research 1 institutions and reflect financial constraints that limit the number of international students who can be supported with institutional funds.

What global and regional demographic changes are impacting Florida State University and region? How are these changes likely to evolve?
In the next 15 years graduate enrollment at Florida State University will be influenced by several factors including: 1) the priorities of the Governor and Florida Legislature in terms of enrollment numbers and areas of strategic emphasis e.g., STEM, healthcare, and energy; 2) changing demographics of prospective graduate students e.g., ethnicity, older students; veterans; and students with disabilities; 3) national and international workforce needs, especially at the master's level; 4) funding to support graduate students; and 5) the needs of students.

According to the U.S. Census Bureau, the current population of the US is about 326 million and Florida is estimated to have 21 million residents recently surpassing New York as the 3rd most populous state. Florida's population is expected to continue to grow to nearly 26 million people by 2030 with Seniors constituting 25% of the people. Regionally population growth between 2000 and 2030 will be approximately 43% in the South, second only to growth in

the West. The South's population represents approximately 37% of the overall population of the country. Most of the growth in Florida will occur in the middle and south region and be due to immigration and migration. The Hispanic population is estimated to grow to almost 28% of the total. Increasing retirements by Baby Boomers, especially will create employment opportunities, but there is concern for a lack of skilled workers to replace the retirees. Another facet of the changing demographic landscape is that minority populations are growing at a faster pace than the population as a whole. Thus students in the public schools are becoming increasingly more diverse and these students represent prospective students for college and graduate school.

The future of Florida State University will be partially shaped by these population changes. As a state university, the undergraduate student body is largely drawn from Florida (88% are Florida residents). As a Research 1 institution it is important that our graduate programs especially our doctoral programs enroll students from across the nation and world. On the other hand, master's programs tend to be more local. Thus it is not surprising that 66% of all master's students at FSU are from Florida, whereas only 33% of all doctoral students are from Florida. Moreover, 32% of our doctoral students and 13% of our master's students are non-US. These percentages have changed little (2% or less decrease) since 2000 with the exception of the % of non-US students pursuing the doctorate (has risen from 26%). This latter change reflects an increase in our STEM enrollments.

Does globalization mean the same thing it did 10 or twenty years ago? How truly global have universities become?
I don't recall globalization being the issue ten to twenty years ago. Rather I believe the focus was internationalization. For FSU and many universities this meant study abroad programs. Gradually internationalization evolved to a focus on attracting more international students to our campus; and then to having a global footprint and in some cases satellite campuses overseas as in Qatar's Education City.

Globalization is about preparing students to contribute and work in a global society/economy. This means that students should be prepared to work with people from diverse backgrounds and appreciate different cultures; be prepared to work in other countries; and be capable of using technology to connect and communicate with persons all over the world.

FSU should definitely prepare its students to work and compete effectively in this global society/economy.

Who are the future graduate students of 2030 or 2040? Are they different from the students our universities communities see today?
As noted above demographic analysis of the youngest cohorts today indicate that the pool of prospective candidates for graduate school is becoming increasingly diverse. If we are to enroll graduate students we must be prepared to deal with an increasing proportion of students who are ethnic minorities, older, women, veterans, people with a disability, and students who choose not to be identified by any particular gender. Most likely more students will want to enroll part-time as they will need to work while pursuing an education and many more will want to obtain a degree remotely via online programs. Increasing competition for international students coupled with changing US immigration policy could make the enrollment of international students challenging.

What can universities do to make their communities as inclusive and accessible as possible to future students?
Recognizing that the graduate student population will be more diverse, universities will need to provide services to support these different groups. We will need to ensure that faculty are prepared to work with a diverse student body and one which is technologically aware, though older, returning and economically disadvantaged students may need support. Websites will need to be welcoming to all and perhaps be in multiple languages.

A current example at FSU is the Center for Global Engagement (GLOBE). The GLOBE seeks to promote interaction among students of all cultures, and works to foster global understanding and awareness. To accomplish these goals, the Center provides training for faculty, staff, and graduate students to become more globally competent by improving intercultural communication skills ([cge.fsu.edu](cge.fsu.edu)).

Globalisation and Demographic Shifts in South Africa

Shireen Motala
Senior Director, Postgraduate School
University of Johannesburg (South Africa)

Globalisation at UJ
Although the terms globalisation and internationalisation do not have exactly the same meaning, internationalisation can be regarded as a strategic response of universities that aim to achieve globalisation. Internationalisation is an integral part of the vision of the University of Johannesburg: *'an international university of choice, anchored in Africa, dynamically shaping the future'*. At UJ, globalisation is understood to mean *"the cultivation of an international environment on campus, where students and staff from around the globe are recruited and fully integrated into UJ life; Internationalisation of the academic curriculum, including through dialogue with the international community about issues of national-global importance; as well as the development of international partnerships and implementation of international collaboration involving research, student and staff mobility"* (UJ Annual Report, 2016). Key targets and indicators are set to achieve the 2025 Strategy, for example: 20% international permanent academic staff by 2020; priority focus on Africa; increased partnerships with BRIC countries, the US and Europe; 1000 students per annum in Study Abroad programmes by 2016, and 3000 students per annum in Study Abroad programmes by 2025. At a postgraduate (including honours and postgraduate diplomas) level, the targets are set as 2000 students by 2020 and 3750 by 2025.

Although this paper focus on student mobility as one of the elements of globalisation, there are factors in the SA higher education landscape that influence other aspects of globalisation. One of these factors is the drive towards decolonisation of the curriculum that is sometimes regarded as in conflict with the aim to internationalise the curriculum. Another factor is that the researchers within SA universities are increasingly targeting international funders for their work and this is fully aligned with the globalisation focus.

South Africa and the Region
Trends in the last decade have led to changes in higher education including diversification, specialisation and institutional diversity. Higher degrees are also seen to play an increasingly important role in preparing students for the knowledge economy. Sub Saharan universities have had to reposition themselves to fit in with global trends. These include preparing students to live in a world that is more connected in both cultural and economic terms, and the need for increased economic development and competitiveness. The demand for higher education in African countries is growing, but levels of higher education provision and enrolment rates are low.

One of the key challenges in Africa is that master's level enrolments are growing much faster than doctoral levels. On average in Africa the conversion from a master's qualification to doctoral enrolment is very low. The developmental role of universities, and the doctorate specifically, in Africa is well understood, however, many of the African countries do not have sufficient resources to invest in the capacity to produce doctoral candidates. There is research evidence that a large proportion of the African doctoral students in South Africa that return to their countries are intending to go into higher education institutes. Against this reality, the SA

government has invested in the doctoral production capacity of the SA universities. Doctoral graduations have a significant impact on the subsidies in SA HE.

The SADC education minister's summit in June 2012 agreed on priorities such as scaling up and modernizing the higher education system through ICT infrastructure, increasing the effectiveness of higher education planning, developing academic quality, increasing mobility of staff and students across the region and internationally, increasing the output of doctoral graduates and strengthening regional cooperation through integration strategies based on agreed objectives, supported by maximizing funding opportunities. However, competing demands on limited resources in Southern African countries has meant that intention and actual implementation are not always aligned.

In South Africa, the 2011 National Development Plan, established ambitious targets on graduate education, in particular for doctoral education. The aim is to produce 5000 students per year by 2030, up from 1420 in 2010. A number of innovations, and best practices have been established, nationally, and institutionally to meet the demand for scale, quality and better alignment with the labour market. These include a number of doctoral and supervisor winter and summer schools provided by South African institutions in collaboration with international institutions , the NGaP Programme spearheaded by the National Department of Higher and Training (DHET), and the Accelerated, Academic Mentorship Programme (AAMP), at the University of Johannesburg. The programmes differ in scale, scope and methodology.

SA as Doctoral Hub for Africa
South Africa has become a hub for higher education in Africa and 2016 UNESCO statistics show that the top five countries from which our international students come are Zimbabwe, Namibia, Congo DR, Lesotho and Nigeria. It is interesting to note that, although four of these countries have English as an official language, the official language of Congo DR is French. There are 21 out of the 31 francophone countries in Africa that has French as an official language. At a master's and doctoral level this has a significant impact on the success of PG students and on their integration into the university's community.

Changing Demographics
The demographics for doctoral and master's headcounts have changed significantly over the past few years. The overall demographic data for SA universities, including UNISA, a very large distance education university, shows an overall increase of 15.8% growth for all international doctoral students between 2014 and 2015. The UJ growth in international doctoral students for the same period was 24.1% and between 2016 and 2017 it was 15.8 %.

The University of Johannesburg has a very strong Pan African focus in addition to its focus on globalisation. In 2017 the percentages for doctoral headcounts are as follows: Americas–0.6%, Asia– 2.4%, Europe–1.2%, Other African–17.9%, SADC excluding SA– 12.8% and SA–65.1%. The success of this is also shown through growth that is higher than the national average and the growth for students from other African countries. For the 2014 to 2015 growth, the national average for other African countries was 14.4% and UJ's growth was 48.8%. The 2016 to 2017 growth for doctoral students from other African countries was 28.9%. UJ's doctoral headcount growth in SADC countries excluding SA from 2016 to 2017 was 6.2% compared to the 4.8% for SA students.

The changing demographics show that the postgraduate profile is changing and the UJ Pan African focus shows clearly. Although the number of students from Asian countries is still fairly low (13 out of 1071 in 2017), collaboration and joint programmes with universities such as Nanjing Tech University, Fudan University, Shanghai Jiao Tong University and the University of Hong Kong, is expected to have an effect.

An Inclusive and Accessible UJ Community for International Postgraduate Students
At UJ there are several initiatives to ensure that the postgraduate students that we produce meet the requirements of the knowledge generation and are equipped with 21st century skills. There is also a focus on diversifying and increasing SET doctoral graduates. The need to increase the scale of doctoral provision is also being met through, among others, the development of supervisors and support programmes for students. These initiatives all benefit on the international students as well.

There is much that the university can do to further ensure inclusion and accessibility for international postgraduate students. There is a division that focus on international students and that facilitates the international aspects of the universities initiatives. This includes welfare officers the UJ English language programme and the development of executive programmes, short learning programmes and joint degrees.

However, when the needs of master's and doctoral students are considered, the UJ Postgraduate School has a significant role to play. It has a mandate to provide holistic life cycle support to PG students and is working towards achieving this in partnership with entities such as internationalisation, Accommodation as well as the faculties.

Funding
Funding for postgraduate students remains a challenge despite the significant growth in postgraduate funding (29% between 2015 and 2016). This is due to the fact that national bursary and scholarships limit the amounts that are available to international students. The UJPS is actively working towards growing the external postgraduate funding and is focussing on opportunities for international students.

Accommodation
Student accommodation provided by the university and around the university is a very real challenge at all levels. The requirements of master's and doctoral students are different and many international students come with their families. In 2016 6.7% (75) of all postgraduate residence students were international students and the 2020 target is that 12% (204) of all postgraduate residence students must be international students.

Postgraduate Student Experience
The development of the UJ Postgraduate experience framework was an important part of achieving the holistic support that the UJPS aims to provide. Dedicated support in research capacity development is provided. The PG language consultants are a particularly valuable support to international students.

Demographic Changes and Graduate Education in the MENA Region

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Graduate education in the MENA (Middle East and North Africa) Region is expected to be affected by two main demographic factors believed to remain in force over the coming decades. The first factor is the large percentage of youth. About 35% of the current population in the region is under 15, and this, compounded with the trends for population growth (averaging 2% annually), means that there will be increasing needs for higher and graduate education. These needs will comprise a number of characteristics, shared globally, and for which the expected population growth will represent significant challenges as well as strong incentives for change. These characteristics entail:

- Growing numbers of part-time graduate students as a result of more competitive job markets. In Egypt, graduate studies, particularly master's degrees and graduate certificates, are increasingly perceived as needed for career advancement and career change. This has led to larger numbers from the workforce joining graduate studies, and a growing demand for professional graduate degrees. It is expected that this will increase over the coming decade, especially with the growing globalization of the job market in Egypt and the region, and its increased competitiveness due to population growth. In this respect, academic institutions of higher and graduate education in Egypt would need to move towards recognizing relevant professional experiences as part of the requirements for the completion of graduate degrees. This would necessitate the development of mechanisms for the assessment of these experiences, as well as associated updates of curricular structures and degree requirements.

- Increasing mobility of graduate students as a result of the growing globalization of local economies and job markets and their increased competitiveness due to population growth. This will necessitate that graduate students have international educational experiences, which will increasingly encompass joint degrees and exchange programs as less costly alternatives to full-fledged international graduate degrees, and as an effective means for the globalization of academic institutions in the region. Currently, there is growing support from governments and philanthropic organizations in the region for international educational experiences. This is expected to continue. The increasing mobility of students will require academic institutions of higher and graduate education in the region to review their curricular structures and degree requirements, with the aim of better accommodating these experiences in ways conducive to consolidating, diversifying, and improving the learning outcomes of their programs.

- A growing need for individualized graduate learning experiences that would accommodate specific needs for professional development and career advancement and change, as well as increased mobility of graduate students. Academic institutions of higher and graduate education, not only in the region, but also globally, will need to rethink the structure and design of their graduate programs so that they allow more flexibility for educational paths and experiences within updated

learning outcomes. Multidisciplinarity is key in this regard. Different tracks within graduate programs, the recognition of professional experiences for the completion of degrees, a better integration of international educational experiences within degree requirements, as well as a wider use of online learning with its associated flexibility, are all obvious ways forward in this respect. However, increased flexibility and individualization of learning experiences will necessitate rigorous assessment mechanisms for graduate programs in which multiple alternative paths would help achieve set learning outcomes.

The second factor expected to affect higher and graduate education in the MENA Region in the coming decades is the size of the refugee population. Political upheavals in the region have led to a substantial refugee population with significant regional and global impacts. Some of the regional conflicts are expected to last for another decade, and while some are resolved, repatriation of refugee populations will continue to be a challenge for decades to come. Needs to provide higher education and graduate education opportunities to refugees are being recognized by governments, private educational institutions and philanthropic organizations in the region, as well as international organizations. In this respect, academic institutions of higher and graduate education will need to review and update graduate admission processes and requirements to allow a better accommodation of unconventional educational experiences and/or incomplete educational records. In addition, graduate students from refugee populations might be in need of additional mentoring that would address possible gaps in knowledge and skill sets required for graduate education. This would require effective mechanisms for determining these needs, as well as enhanced and adapted structures and programs for providing this type of support. As an example of an initiative for enhancing accessibility of refugees to graduate education, The American University in Cairo (AUC) recently established graduate fellowships for refugees. The fellowships are available to those with refugee status as well as asylum seekers, and provide wider financial support than other graduate fellowships available at the university. Moreover, these fellowships cover the costs of intensive remedial English language programs, available at university, for up to one year prior to the start of the graduate courses. Graduate Studies at the university will be embarking on an initiative with the Center for Refugees and Migration Studies at AUC to work more closely with refugee communities and organizations in Egypt and the region. This initiative would aim to offer more accessible graduate education opportunities to refugees.

While the globalization of local economies and job markets in the MENA Region has been underway for a number of years, the globalization of higher and graduate education in the region has been progressing at a slower pace. The establishment of satellite campuses of US and European universities in the region, together with the roles played by established private international universities in the region, such as The American University of Beirut (AUB), AUC, and more recently the American University of Sharjah (AUS), contribute to the globalization of higher and graduate education in the region. Increased globalization primarily rests on the internationalization of campuses with higher mobility of not only faculty and student bodies, but also of programs and institutions. This demands highly adaptable curricula that effectively address global issues in addition to local ones, financial and governance structures that promote internationalization and ensure quality, and effective responsiveness to demographic factors and needs in the region as discussed above. AUC prides itself in being Egypt's global university. It continues to represent a model for the successful internationalization of higher and graduate education in Egypt. This success relies on an international faculty body, as well as on a good mobility of its student population. In recent years, and because of political turmoil in Egypt and the region, the numbers of inbound international students

has declined. In consequence, the university has embarked on assessing alternative ways of enhancing its international outreach. Online learning was identified as a useful mechanism to this end and its use in this regard forms an integral part of a recently developed online and blended learning strategy at AUC. Additionally, the two demographic factors presented above are recognized at AUC as crucial for the evolution of the graduate education opportunities it offers. The challenges associated with addressing these factors are also recognized as priorities to be addressed.

2: Trends in Technology

Advancing Graduate Education by Supporting the Graduate Student Lifecycle

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Graduate and professional education are undergoing rapid and pervasive changes. Global student flows, educational delivery models, the demographics of students interested in graduate education, and the global capacity for graduate and professional education are all in flux. Today's students have grown up in a digital age and they come to graduate education with far different expectations than previous generations. At ETS, we believe that continued future success in global graduate education will require significant changes in how students interact with the many "systems" that collectively support the graduate student ecosystem. To start, we need to consider the entire lifecycle of a student from the first point at which they begin contemplating graduate education, and ultimately into the careers they select following graduate education. Moreover, there are significant advantages to taking a holistic look at how students interact with the modern information systems that support graduate education and leveraging information across systems to help increase student success.

One inarguable attribute of graduate education is that students are the ones who experience it from beginning to end. As such, looking at graduate education through the lens of the student lifecycle of experiences — into, through and out of graduate education — may offer insights into what products, services, innovations and strategic relations among stakeholders would improve the overall quality of graduate education.

Using this perspective, the GRE® Program envisions a holistic and integrated model of the types of services and supports that could be developed to aid students and institutions as they interact through the graduate education ecosystem. This approach is an idealized, yet pragmatic, model of a range of products and services that could be brought together to improve graduate education. This model does not assume that ETS and the GRE Program would "build" an entirely new set of tests, products and services. Rather, the model seeks to describe a "system" that ***could be developed by the graduate community***, including diverse providers of products and services.

We are placing system in quotes to signal the fact that we do not envision this to be anything like a centralized system of products and services that would be developed, offered and controlled by ETS. In some regards, this system is like the U.S. system of higher education — a vibrant collection of organizations, resources, agreements, funding sources, etc., that serves as a global model for excellence. The U.S. system of higher education has been well served by valuing and supporting diversity in all facets of higher education (e.g., types of institutions, markets served, the mission and vision for each institution, public vs. private). Likewise, the system of products and services that could enhance the graduate student lifecycle will similarly benefit from a range of approaches to addressing the "pain points" along the student journey. With this perspective in mind, let us consider some of the key

features of this system or model of how student and institutional needs can be met through coordination across the phases — into, through and out — of graduate education.

The Model. Assuming that there are at least five distinct "phases" of graduate education, the following high-level descriptions of each of these phases of the graduate student lifecycle are intended to provide a common frame of references as opposed to providing exact definitions and/or bright-line boundaries.

1. *Recruitment*. Activities that programs, institutions, systems, etc., engage in in order to increase familiarity and interest in either specific programs or graduate education more generally. Consider also those activities designed to increase the size, quality or diversity of the application pipeline.

2. *Application*. Activities that candidates are required to complete in order to apply to graduate programs for admissions and/or funding. The application stage could also examine the institutional processes involved in collecting and managing applications. Overall, the focus here is on the process of providing information and materials that are used to inform admissions or funding decisions.

3. *Admissions*. Institutional/school/program processes that serve to support admissions and funding decisions, regardless of whether the decisions employ traditional processes or innovative processes such as holistic file review. The hallmark of these decisions is that there are specified inputs and a finite set of outputs that are shared with the applicants.

4. *Graduate Program*. All of the educational and extracurricular activities that are available to admitted students, from initial acceptance to the programs through exiting the programs.

5. *Career*. The professional and employment phases of the students' lives after exiting the program.

It is important to note that while the GRE and *TOEFL*® tests have traditionally focused on the admissions phase, there are pain points and opportunities for innovations across all of these segments. An integrated system that allows information to be shared across boundaries (e.g., admissions information being used to guide course selection, professional development, etc., in the graduate program) will improve the overall educational experience.

"System Characteristics." At the highest level of description, the system, as we envision it, is intended to have these characteristics:

- Provide support and resources across all five stages — an end-to-end system
- Link and share information across stages
- Include an integrated set of resources, products and services
- Be holistic, in that it addresses both cognitive and educational goals/needs, as well as social needs (e.g., networking, professional development, mentoring). The model is intended to address cognitive and noncognitive dimensions of students and education/professional development
- Be potentially useful to deans, program directors, faculty, diversity officers
- Support the needs of programs ranging from non-selective masters' programs to highly selective Ph.D. programs

- Support the needs of both individual students and groups of students
- Support the needs of graduate programs to achieve key success criteria, e.g., diversity efforts, admissions and enrollment targets, student success in programs, student success in career

We envision graduate education in the future as being less of a series of "hurdles" that students must pass and more of an integrated set of supports that help students be successful on their academic and career journeys. This system should include universities, other "nontraditional" education providers (e.g., MOOCs), as well as commercial service providers. By effectively sharing information about students across traditional boundaries, we can create a much more supportive educational environment than the ones that are currently in existence.

Doctoral Education in the Digital Age

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The challenges of digitalisation were highlighted as critical for the members of the EUA/CDE in its strategic paper *Taking Salzburg Forward*.[1] This is not surprising given the way in which these technologies pervade and transform the practice and content of research and of the way in which university systems support their staff and students. The EUA/CDE annual conference in June 2017 took up the theme of digitalisation as a game-changer for doctoral education.[2] Are we already at the peak of the digital transformation or will this agenda continue for the next decade and beyond?

There are three key dimensions in which the doctorate faces the digital challenge: in management and supervision, in the process of research and in its content. For management and supervision the lifecycle of a candidate from admission, through progress monitoring, to completion and publication are affected. Along the way key issues such as compliance and ethics and skills training are also in scope. Compliance may cause tools to be repurposed – for the University of Manchester our internal electronic doctoral progress monitoring system now also serves to ensure compliance with attendance regulations imposed by the immigration authorities.

For a university's IT provision, doctoral education can be particularly challenging as candidates typically sit at the intersection of three systems which are typically at least partially independent: the *student system* covering processes such as registration and progress issues, the *staff system* covering, for example, employment and payroll matters and the research system, which manages topics such as publication and access to equipment and facilities. These reflect the multiple and transitional identities of doctoral candidates. In an information technology Nirvana all of these exist with seamless operation and interoperability but this is rarely the case. More often ad hoc interpolation is needed.

When we come to the research process, the real drivers of change become apparent. Almost every stage is being transformed by digital innovation. At the University of Manchester we use the concept of the research lifecycle to describe these as illustrated in Table 1.

Table 1. Digital Dimensions of the Research Lifecycle[3]

Research stage	Content and issues
Inception	Research intelligence, conceptualisation, knowledge review
Management & Administration	Proposal development, peer review, costing, ethical approval, sign-off/submission, offer acceptance, recruitment, finance, reporting, facilities access, management information

1 European University Association, Taking Salzburg Forward – Implementation and New Challenges, April 2016 http://www.treua.be/activities-services/news/newsitem/2016/04/28/taking-salzburg-forward-new-eua-cde-recommendations-on-doctoral-education

2 http://www.eua.be/activities-services/events/event/2017/06/15/default-calendar/10th-eua-cde-annual-meeting

3 Table based on original by Chris Taylor.

Research stage	Content and issues
Knowledge creation	Theory development, experiment design and measurement, modelling and simulation, data analytics, tools & resources
Research data management	Data management planning, secure storage, metadata capture, data sharing and collaboration, data deposit, data archiving and curation
Publication	Manuscript preparation, peer review, preparation of supporting data, open access publication of manuscripts, data & software
Impact generation	Business engagement, marketing, protection of IP, licensing
Research assessment	Internal performance monitoring, funder outcome reporting

It is probably in the central areas of knowledge generation and publication that the most radical changes are in process. The moves towards open access and open data are gathering momentum despite deliberate resistance from publishers and reluctance by academics to abandon journal hierarchies around which personal and institutional status have been built. Without going in to the detail of the open science debate it is clear that there are significant implications for doctoral research. The thesis by publication is created around an external reference point that could be harder to interpret and examine if post- rather than pre-publication review became the norm. For early career academics the platform of upon which they compete for their first position may also become more difficult. On the other hand they are likely to be beneficiaries of the much greater access to the work and data of others that might otherwise be hidden behind paywalls.

The process of research is also about methods. Across a broad front of topics mastery of digital media and data analytics is becoming a requirement. Research tools include text-mining, use and analyses of social media, modelling and tools that facilitate collaboration. Even in the arts and humanities the growing weight of digital humanities is an important trend. In many of these trends, generational effects may mean that the doctoral student may have greater mastery than the supervisor. For all, the availability of online resources and distance or blended learning increases the independence of researchers and the reach of training but may reduce the social cohesion of the learning experience and the positive spill overs that brings to the induction of new members of the scholarly community. A new balance may need to be found between on-site and distance learning, with consequences for capital and other investment.

For the content of research the digital society is itself a frequent object of research, bringing up issues such as cybersecurity, privacy and governance. Other fields such as computer and data science continue to push the barriers, while at the frontier of the physical sciences developments in 2-D materials and quantum computing herald a new generation of far more powerful technologies to underpin digital transformation. Artificial intelligence aids are likely to take much of the drudge out of research while opening new possibilities. All of these are positives but we also need to be aware of potential negative consequences. The so-called digital divide could exclude those without access to the appropriate resources. The potential for research misconduct, notably the appropriation of others intellectual property and the manipulation of data, has been greatly expanded but so have the tools for detecting it. The trend to increased productivity in research shows no signs of abating but risks crowding out some radical ideas that take longer to gestate or which operate outside the current digital paradigm.

Standards for Off-Campus and Online Graduate Research Programs

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For many years, teachers were considered the fountain of all knowledge, and students would listen attentively as knowledge was transferred passively from teacher to student. However, with the advent of the internet, digital natives and almost limitless information the concept of passive learning is rapidly being replaced by active learning with quality content that is available to a much greater portion of the population. MOOCs, Open Access repositories and sites like Sharemylesson, Khan Academy, Wikipedia, Edmodo, Youtube EDU, Edutopia and Ted-Ed are available to help students and teachers to freely share their knowledge and collaborate.

Not only has there been an explosion of free information, but also technology is enabling customised or adaptive learning systems, which adapts material being presented in response to student performance. With all these rapid changes, it's clear that education as we've know it for many years is on the cusp of major change. How will this affect the delivery and quality of Doctoral Education? What is the potential to deliver online, offshore, off-campus Doctoral Education while maintaining and safeguarding the integrity and value of the PhD qualification?

At Edith Cowan University (ECU), we introduced an Integrated PhD program in 2015, which consists of one full year of research preparation coursework, followed by another three years to complete the thesis. This program has been very popular, and since its introduction, have received numerous enquiries from remote and offshore candidates about the possibility of offering the program in an online mode. In particular, our School of Nursing has received many requests from potential high-quality students (both domestic and offshore), who are only able to undertake the PhD (Integrated) in an online, flexible mode. In conjunction with interest from other international markets, this presents an opportunity to develop and expand the Integrated PhD program to online mode.

Further to this, recent surveys at ECU revealed a high number of PhD students self-identify as external or off campus students, raising issues around support, equity, accessibility and quality assurance. There is also interest from other candidates who want to do PhDs at ECU but do not want to shift to Australia for a variety of economic, professional and personal reasons. So, we need to accommodate off-shore, external candidates, while ensuring appropriate standards and QA measures.

To try and understand how other Australian Universities are approaching this issue, ECU led a Special Interest Group (SIG) with around 55 Australian representatives in July 2017 focusing on identifying best practice for online and off-campus PhD delivery. The SIG forum found common problems across institutions relating to the importance of a robust application process, assessing the viability of the student/supervisor/project combination, supervisor training, supervisor buy-in, appropriate support services, and ensuring high quality pastoral care for the off-campus and online student.

The SIG agreed that best practice standards were needed to help drive the delivery of online and off-campus PhDs. This will rely on a whole of institution approach, and in some areas a complete overhaul of systems, processes and procedures incorporate learning technologists and dedicated instructional designers.

At the SIG, it was decided that a group of participants would work on developing some standards/guidelines for online and off-campus graduate research candidates who may not be able to attend campus for all or part of their supervision/research training. This may be a result of equity issues, being in another country, or hosted by another university or industry partner.

The draft guidelines will be discussed a full meeting of the Australian Council of Graduate Research in Vietnam in November 2017. The following represents a preliminary draft of what is being developed.

1. **Institutional policy and governance**
   - Whole of institute support for online and off-shore delivery
   - Legal and regulatory compliance, including institutional rules, policies and guidelines for online and off-shore delivery
   - Systematic approach to resource allocation/budget for technology enhanced learning
   - Reliable technology enabled for online and off-campus students
   - Communication between supervisor to student, supervisor to supervisor, and students to support staff
   - Access to training materials effective and well maintained
   - Professional development for all staff involved in the delivery and support of online

2. **Standards for Technology Enhanced Learning and Teaching**
   - Engaging curriculum materials and activities
   - Information and communication technology that is reliable and supports engagement
   - Well-designed curriculum and assessment tasks
   - Timely and quality feedback
   - Being inspired and challenged by their teachers and supervisors
   - Opportunity to engage with others – peers, academics and professional staff
   - Student progression and assessment strategy through online platform

3. **Student Support Services**

   Off-campus or online candidates should have access to the equivalent services available to students who study on campus. This includes:

   - Structured and clear induction process
   - Training and support for the effective use of technology
   - Counselling and Pastoral care
   - On-line library resources
   - Platform for social, engagement, peer mentoring and connecting with other research students

4. Doctoral program offering and delivery

- International accreditation of online doctorates (e.g. some governments will not recognise a doctorate unless the student has spent a minimum amount of time on campus)
- Accountability structure for offering online and off-shore programs
- Partner infrastructure and onsite support
- Partnership management and communication
- Identifying single or cohort delivery strategies
- Costing and financing the delivery of the program
- Online education/teaching is recognised in workload
- Copyright and Intellectual Property consideration
- Retention strategies
- Graduation considerations
- Program evaluation – monitoring performance outcomes and implementing continuous improvement strategies

5. Admission and Enrolment

- Availability of appropriate technology for online instruction
- Appropriate level of digital literacy required
- Project/thesis aligned to mutual areas of strategic interest and strength
- Project/thesis resources such as laboratories are available for the research

6. Candidature

- Confirmation, Annual Review, Course work, Examination and Oral Defence
- Examination and Oral Defence committee
- Award

7. Supervision

- Supervisor selection process
- Supervisor training for online supervision
- Appropriate workload allocations
- Schedule of time and meeting with students
- Training for the effective use of technology enhanced learning
- Support for supervisors, academics and professional staff using educational technology to connect and communicate with students

Online Education at the University of Iceland: Current State and Future Direction

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The University of Iceland (UI) was founded in 1911 and is today a medium-sized university with approximately 14,000 enrolled students, 600 of which are doctoral students and 3,700 are master´s students. The doctoral programmes are relatively recent and the first doctoral graduation from a formal programme took place in 1997.

The typical master's programme at UI is a 120 ECTS programme with a 60 ECTS research component and 60 ECTS courses. Normally, the doctoral programme is 180 ECTS in total: a 120 - 180 ECTS research project and 0 – 60 ECTS in courses (different between different schools within the UI).

When asked about challenges in their programme in a recent satisfaction survey, doctoral students at the UI identified among other challenges the lack of courses available at the doctoral level (particularly in English; 30% of all Ph.D. students are of non-Icelandic nationality). In the same survey master's students stressed the need for more distance/online courses.

UI is a traditional higher-education institution with an on-site lecture based approach to teaching. In recent years the availability of online courses has increased with the advancement of technology and increasing demand. Still, distance courses are a small part of the catalogue. Currently, of almost 1900 graduate courses (masters and doctoral) available at the university, about 170 are distance courses, many of them a mix of distance learning with on-site sessions.

The main reasons for this somewhat modest response to modern technology are: lack of resources, concerns about quality, and the culture of the university. Developing new online courses or programmes is expensive and time consuming. The UI is publicly funded and the funding has not allowed for teaching both on-site and via distance learning. As such, distance learning has not been a priority at the UI although this may change in the near future. Also, doctoral programmes at the UI are very research-oriented and in some faculties ECTS obtained from courses are not required to finish a doctoral degree. The students themselves sometimes take the initiative out of sheer interest and there are examples of students that have taken online courses offered by other universities while not wanting to pay the extra charge for taking the final examination, therefore, not obtaining any ECTS for their effort.

Quality assurance is another concern. For example, how to evaluate online courses available at other universities. Contracts at the institution level (for example through edX) regarding online courses would facilitate a comprehensive and consistent evaluation of credits into the UI doctoral programmes. Another quality related challenge is how to make sure that students are active participants in online courses. Having the opportunity to study online while working full-time increases the risk of the studies being neglected.

The third issue mentioned is culture. Changes within universities tend to happen at a slow pace. The university is a complex and traditional institution and the paradox of quickly adopting new ideas and technologies in research and science and at the same time being inert to changes in how to communicate knowledge to students has been mentioned before. However, it is important to not adopt new technology for technology´s sake. The on-site lecture model continues to be the preferred form of teaching at the UI even if it is necessary to reap the benefits of online learning where it best fits.

Within the UI, the School of Education has the largest repertoire of distance courses and offers master's and diploma programmes designed for professionals who want to expand their knowledge in the field while working full-time, as well as giving people living outside of Reykjavik the opportunity to obtain a degree without having to move to the city. The effort has been welcomed but has, however, raised some concerns. The distance courses are frequently based on existing on-site courses, some of which may be difficult to adapt to an online model. This has increased workload of teachers and, in some cases, compromised the quality of the course which in turn affects the satisfaction of both students and academic staff.

It is important for a research university like UI which has limited resources to offer its own doctoral courses to embrace the concept of online education. This is not least important if the UI wants to expand the list of graduate courses in English. Despite the challenges, the opportunities in enhancing the quality and diversity of the graduate programmes through online courses are vast.

In 2016 the UI agreed upon a new strategy (UI21) for the period 2016 – 2021. The strategy emphasizes the need for distance teaching, good IT services, support for international cooperation, tech transfer, etc. In connection with the UI21, a new a strategy for teaching and learning is in preparation. A substantial part of the new teaching strategy is dedicated to distance learning. The experience from the mixed model of on-site and distance learning at the School of Education will be evaluated and, subsequently, a comprehensive strategy of online learning will be developed. In addition, the UI is planning to join the distance learning network edX, to support the development of in-house online courses. While it is important for UI students to have access to online courses at international universities, the visibility of UI is important. Online courses developed in-house will be one way of reaching out to the international community. In addition, UI participates in a newly founded European research university network that will hopefully come with the added value of better access to online courses as well as opening up other types cooperation possibilities.

A Double-Edged Sword: Postgraduate education in a context of an underdeveloped high technology industry

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In this paper I argue that South African universities such as Free State University are well positioned to benefit from the current underdevelopment in high technology industries on the African continent. Yet, the higher education sector needs more strategic support from the state in terms of infrastructure development and provision of enabling technologies to convert opportunities into competitive, technologically advanced, research and developments. As information and communication technologies break down geographical boundaries, universities on the continent benefit from opportunities to collaborate in technology driven research projects for example the Square Kilometre Array project in astrophysics in which University of Free State participates, as well as in large scale renewable energy projects including solar and wind farms.

South Africa is considered to be the country with the largest research base on the African continent, yet science and technology research and development seems to be languishing. In contrast to South Africa's declining national position in global science and technology, individual scientists and research groups occupy influential positions in a wide range of technology intensive organisations across the developed world. The fact that South Africa seems to be a fertile breeding ground for scientists for developed countries, emphasise the opportunities for high quality postgraduate education and technology based postgraduate research.

The University of Free State is located in the central region of South Africa, in a semi-arid province with a relatively low per capita income. The provincial economy focus strongly on mining and agriculture, and this focus also manifests in the research focus areas of the university. The lack of regional investment in enabling technologies such as high performance computing facilities, specialised diagnostic equipment and manufacturing technology pose a challenge to our university. But there are excellent examples of how government investment in enabling technologies promoted rapid establishment and expansion of research groups conducting high impact research. One such example is the acquisition of a 3D printing facility by the Centre for Rapid Prototyping and Manufacturing (CRPM) at Central University of Technology (Bloemfontein) that lead to the establishment of a ground-breaking research facility that uses 3D printing for medical purposes.

The underdeveloped technological and industrial components of the regional economy serves as a serious threat to postgraduate education and research at the university. Especially in terms of access to expensive equipment, and difficulty to develop industry-university collaborations due to long distances between highly developed industrial hubs and the university. The high cost of the acquisition and maintenance of technologically advanced resources and infrastructure also poses a threat to the ability of the university to stay abreast of the latest developments in the field.

The university uses two strategies to build strong research groups with a global impact and with the necessary capacity to respond to rapid technological advances in the field: clustering and collaboration. Three examples of the implementation of these strategies can be observed in the Groundwater, CRPM and the Afromontane Research Groups. These research groups pool technological expertise and resources from a variety of disciplines (for example, geology, geophysics, chemistry and agriculture) to build strong research clusters with critical mass to attract and support large groups of students from across the African continent that work on issues such as water conservation, medical prototype development and montane biodiversity. These research clusters also provide supportive learning communities for postgraduate students and rely heavily on collaboration with industry, institutional networks and international partners to acquire expensive equipment and gain access to infrastructure to support their research and provide advanced technological training to students. The benefit of the international collaboration is the exchange of expertise, expanded supervision capacity and improved access to scarce equipment and resources necessary to advance research output and impact. The downside of the collaboration is that postgraduate students and early career academics often find it difficult to re-adjust to the challenges of working in under-resourced environments once they return from international exchange programs and many return (often permanently) to well-resourced, technologically advanced work environments in developed countries.

Advances in learning technologies increased the offering of international on-line programmes, yet it seems as if students prefer blended programmes. These programmes have a limited contact component, supplemented with on-line learning activities and interactive learning communities. During the last ten years many universities established Postgraduate schools. Since the establishment of a Postgraduate school at Free State University, the Postgraduate School has used a strong on-line support and communication network aimed at reaching out to a diverse student body spread over four continents. The Postgraduate school endeavours to provide on-line resources and training opportunities to students who do not have sufficient access to the support and guidance of their supervisors and as a research capacity building opportunity for part-time, distance students. Our on-line training programme also extend to supervisor support and development programs. The entry of international on-line programs increased the pressure on local universities to provide better quality and more support to students, especially in the current climate of intense competition to attract more postgraduate students. Collaboration with international networks strengthen the quality of our on-line support and resources especially in terms of supervisor support.

An important development is the establishment of the Postgraduate Forum for South Africa. An organisation that will serve as a future Council of Graduate Schools. One of the strategic projects of the forum is the development of an on-line postgraduate student and supervisor resource to address the inconsistencies in graduate support and quality of research training across South African universities.

Technological advancement open excellent opportunities for our university, but the limitation of our geographical context, and its underdeveloped technology industry, pose a threat to our ability to compete with universities in better developed, technologically advanced regions and the gap is increasing rapidly.

PAGE 40   ELEVENTH ANNUAL STRATEGIC LEADERS GLOBAL SUMMIT

3: Generational Perspectives

Student Centered Education to Attract and Motivate Millennial PhD Students

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Doctoral education, particularly in STEM fields, still routinely uses the outdated master-apprentice model of advising/mentoring. Additionally, doctoral education is inconsistent and often haphazard, and many faculty members see it solely in relation to dissertations rather than throughout program stages. Advising of doctoral students should encompass more than dissertations but include advising from beginning to graduation. Advising should emphasize intentionality, making expectations and the process more explicit. Most importantly doctoral education must more routinely include the characteristics to become more student centered to attract and motivate millennial doctoral students.

At Texas A&M University, we are studying a new doctoral STEM education model[1], incorporating eight components, which aims to instill in students the ability to become self-directed and lifelong learners. The model asserts unique responsibilities upon four groups -- the institution, program, faculty mentor(s), and student -- to elicit the transformation of the student to a scholar. The individual development plan (IDP) is a critical tool that spans across various components of the model. According to FASEB (the Federation of American Societies for Experimental Biology), the purpose of the IDP is to "provide a planning process that identifies both professional development needs and career objectives for success in a full range of career paths. Furthermore, IDPs serve as a communication tool between individuals and their mentors." While IDPs are being 'implemented' across the U.S., particularly to meet the funding requirements of the U.S. NIH (National Institutes of Health), our experience at Texas A&M is that advisors are not utilizing the IDPs adequately and the advisor is not being held accountable for the effectiveness of their utilization.

To support the effective use of the IDP, professional development for the advisor and accountability are included in the model. Professional development for advisors focused on the purpose and implementation of the IDP is critical because they must clearly understand the IDP process to support their students as they progress through the degree program. The advisor professional development provides an introduction to mentoring, discusses relationship management, including communication, conflict resolution, micro-aggressions, and implicit bias, steps through the IDP (for consistency and better understanding of intent), and discusses evidence based practices addressing the unique mentoring needs of first generation and minority students. Specifically, faculty review and discuss the literature on mentoring, engage in a number of reflective exercises to enhance their readiness as advisors and identify personal advising and communication styles, practice having productive conversations with advisees around difficult topics, and develop an advising action plan. Subsequently, working group sessions provide faculty with the opportunity to reflect on their advising practices and discuss with peers needs, concerns, or successes related to their roles as advisors.

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1 Pardo, M. L., Fowler, D. A., Butler-Purry, K., de Miranda, M., and MacWillie, S. STEM Doctoral Education Model, Unpublished manuscript, Center for Teaching Excellence, Texas A&M University, College Station, TX.

Accountability is addressed through the utilization of an annual online doctoral student feedback system whose main goal is to facilitate annual feedback easily between doctoral students and their advisor and committee members in regards to their progress towards degree completion and the goals of students' individual development plan. Integrating the degree requirements and IDP career objectives, the system provides a mechanism to identify instances of ineffective advising resulting from situations such as incongruent student and advisor expectations, advisor inattention, etc. Also, the institution or program should provide funding for faculty recognition of exemplary mentoring and incorporate mentorship expectations in annual faculty evaluations.

A strong component of the model is learning communities designed to broaden students' understanding of career options and pathways and use that is the basis for the design of their IDPs. The IDP tool enables students to personalize their plan to their unique career/professional development needs, as it walks them through exercises to identify existing strengths, weaknesses, and gaps. The learning communities encourage students to create relationships with peers inside and outside of their discipline and develop leadership, communication and collaboration, critical thinking, ethical behavior, conflict management, and self-reflection skills. Further students engage in appropriate experiences such as internships and externships, a graduated set of teaching experiences in a variety of settings, and traditional research post-doctoral experiences and non-research post-doctoral experiences in other academic units.

Two STEM programs at Texas A&M are studying the model via incorporation of some of its components, particularly learning communities, mentorship, and IDPs. Each program implements the components in a manner that best addresses its mission. One focuses on such as graduate students pursuing interdisciplinary STEM research training for diverse careers. And the other focuses on historically underrepresented STEM doctoral students interested in the professoriate. As the studies advance, data will be available to assess ease of implementation and assessment of the components of the model that are most effective for attracting and motivating millennial doctoral students for lifelong success in diverse careers.

Educating Millennials at Purdue University and the University of Texas at Austin

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The rate of new knowledge creation is higher now than ever before. Advancements in technology that have occurred over the last four decades have not only revolutionized services and opportunities for everyone, but are changing the thinking, perspectives, and aspirations of each new generation. Present day college students (most of whom now were born after 1990—the millennials) grew up with the internet, the cell phone, and instant access to information and are plugged in to an online society void of physical borders. In this short article, several significant educational programs underway at the University of Texas at Austin and Purdue University are highlighted that exemplify how universities are adapting to millennial students.

Ask any professors about their recent teaching experiences compared with classes taught in the 1990s or 1980s, and they will tell you that students now are different. Professor Craig Watkins in the Moody College of Communication at the University of Texas (UT) at Austin, led a two-year study involving more than 100 interviews, in which he and his team of graduate students examined the expectations, perspectives and behaviors of millennials. Among his many findings are that millennials desire physical spaces to collaborate and network and that they heavily use social connections for feedback and access to information. Although one can effectively argue that universities have been slow to embrace curricular change, many institutions are responding to these expectations.

At UT Austin, a major effort is underway to revolutionize teaching and learning at both the undergraduate and graduate levels. The initiative, called Project 2021, provides instructor access to new teaching pedagogies, support to instructors and departments seeking to institute curriculum changes, and expert consultation. The Project 2021 team, led by Professor James Pennebaker, has assembled a Research and Measurement group (a.k.a. RAM) to compile and analyze campus data to identity priorities for innovation and support student success. The group is also working with departments to catalyze curriculum redesign, with RAM overseeing large scale survey projects to inform that process. At the conclusion, RAM will continuously collect and analyze quantitative date to assess the impact of the redesign.

Good teaching should continue to be an institutional priority and thus the identification of outstanding teaching practices should remain a priority. RAM has been tasked with assessing innovations already underway on campus and facilitating collaborations with individual faculty and departments to further explore their use.

Supporting millennial students in their career choices is equally important, and thus an integral part of the academic equation at UT Austin. RAM in collaboration with several offices across campus is attempting to construct statistical models to identify student decision factors that impact degree completion, achievement, and job placement. The outcome of this work could ideally assist advisors and other student support services.

An excellent example of academic innovation aimed at millennials is the work underway in Purdue University's School of Engineering Education, where professors and graduate students study new pedagogies as the core of their scholarly research. The faculty, staff, and graduate students have recognized the need for interactive hands-on engagement and have designed innovative facilities that provide an experiential, collaborative, reconfigurable learning environment for first-year engineering students, typically 18- year-olds, i.e. the newest of the new college generation. Using these facilities, professors teaching the gateway courses can efficiently engage students in group learning, taking them through a full cycle of the product design process from conception and design to fabrication and evaluation.

The *Design Studio*, for example, features group workspaces with floor-to-ceiling whiteboards, allowing students to conveniently write and sketch out ideas for their designs, and mobile carts with tablet PCs, data acquisition equipment, and other tools for team project development. Six video projectors are located in the studio so that students can independently view course materials as well as project their own work on screen for further discussion.

The adjacent *Innovation Studio* houses "smart tables" supported by Microsoft Surface tabletop touch-screen computers along with floor-to-ceiling white boards, where students can create visual images of their ideas, unconstrained by the confines of conventional paper. The studio is also equipped to allow students to send their sketches and ideas electronically over the internet to other locations or to a collaborative team via special wall-mounted cameras. A *Prototyping Studio* is available with 3D printers where students can go from computer-aided design (CAD) drawings to a physical model within a few hours. In the *Fabrication Laboratory*, students work with wood, plastics, and other materials as well as gain experience working with routers, drill presses, and other equipment to fabricate a working model. Then in the *Demonstration Studio*, teams can present their work for critique and feedback.

These are just a few examples of how two universities are migrating toward collaborative, experiential, and interactive learning aimed at millennial students. Much of this work is being pioneered by faculty and graduate students for undergraduate millennial students but we are seeing many of these practices working their way into the graduate curriculum. At both Purdue and UT Austin, we are seeing more and more graduate students and young professors introducing modern curricular ideas with appeal to younger generations.

It is projected that by 2025, millennials will make up 75 percent of the workforce. Hence, for industry employers, it is imperative that they adapt their culture to attract the best and brightest workforce talent. Many faculty are paying attention to these changes in industry. In fact, we are seeing a trend in some disciplines toward working more closely with industry employers through collaborative research and advisory board interaction. This is having an influence in many departments and is helping to drive university culture change. At the graduate level, change is particularly visible in a number of the online graduate courses where students are interacting with their peers over the internet asynchronously and are engaging in group projects that can involve students from all over the country. Over the next few years, we expect to see significantly greater attention to personalized, flexible, and interactive curricular for graduate students both at UT Austin and Purdue.

Globalization, Egalitarianism and Evolution in Graduate Education

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Generalizations about the character or attitudes of various generations have the effect of portraying members of generations as a homogenous whole, downplaying meaningful differences within the generational grouping. This problem is particularly acute when examining populations that span national borders and have had vastly different formative experiences, as is the case for graduate students at many larger research universities.

However, two broad trends are colliding in ways that shape the experience of 'millennial' or 'generation Y' students, and therefore have significant impacts for graduate education. A gradual value change favoring social egalitarianism and increased global mobility have combined to populate graduate schools with diverse populations of students who are less accepting of hierarchies and traditional authority relationships. As generational replacement affects both the population of students and supervisors, the traditional 'Master-Apprentice' model of graduate supervision is disrupted and requires re-negotiation. Moreover, the psycho-social support needs of the student population are significant.

Social Egalitarianism: One of the more remarkable social transformations of the past six decades is a process of generational change in fundamental values favoring social egalitarianism.[1] The idea that all people are fundamentally equal, and deserving of equal treatment or equal opportunity, has gained currency across most societies in the post-war era through processes of generational value change. Certainly, the rise of egalitarianism has played out differently in different cultural contexts, with very different starting points; cross-national differences often outweigh generational variation. The rise of egalitarian attitudes should not be understood to be either linear or inevitable, and are certainly contested in many quarters. Nevertheless, as families have become less hierarchical (both in gender and generational terms), and other organizations have relaxed norms around vertical hierarchies, we have seen a decline in conditioned deference to authority. This has profound implications for social and political life, but also plays out in everyday encounters within organizations. Observations about North American millennials' rejections of workplace hierarchy are one example of this.

Globalization: Increased economic, social and cultural interdependence across national borders, together with emergence of truly global networks of researchers, have made major research universities global hubs attracting students, researchers and faculty from all corners of the globe. Institutions that saw themselves – as recently as twenty or thirty years ago – as serving a local or regional population and competing for faculty within a national labor market now strive to recruit students from emerging markets, attract faculty members in a global labor market, and position themselves within global ranking systems.

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1   This broad generalization is based on the over-time findings of researchers using the World Values Survey, which has systematically surveyed values and attitudes in over 90 countries, conducted periodically since 1981. http://www.worldvaluessurvey.org/wvs.jsp

Implications for Graduate Education: As these two trends collide, the "millennial generation" we find in our graduate programs is comprised of a highly diverse group of individuals whose 'millennial' experience reflects very different formative events: membership in the first generation of children without siblings in China, participation in the Arab Spring or the Canadian indigenous Idle No More movement, or the experience of helicopter parenting by North American baby boomers. It is tempting to argue that all that these 'millennials' have in common are their mobile phones and WhatsApp. However, research noted above confirms an observation that graduate students' attitudes have gradually changed over time to be less deferential to hierarchical structures, including supervisory relationships. In general terms, students have become less tolerant of what they perceive to be abusive or exploitative relationships, often rejecting demands for excessive hours of work or unconditional obedience. Students come to the supervisory relationship with higher (and sometimes unrealistic) expectations of the extent and type of mentorship they should receive. When supervisory relationships are fraught, students are more likely to seek out support from campus wellness. Cross-cultural differences in expectation and communication within the supervisory relationship often compound these issues. Generational differences are also present, as new/younger faculty members struggle to assume their supposed role as 'master' in the master-apprentice relationship.

How are we responding? The University of Calgary is a mid-size research intensive university with just over 6000 graduate students. International students comprise a substantial proportion of that number, at 27% and rising steadily. Our largest numbers of students in thesis-based graduate programs are in Engineering, Science and Medical Science; in many of these programs, international students comprise a significant majority of students, and are supervised by faculty members who are almost as diverse in their cultural origins. Two core initiatives of our graduate school respond to the issues identified above.

First, we have focused on improving both supervisors' and students' capacity to foster a productive and professional supervisory relationship by clarifying expectations and enhancing capacity for effective communication. This includes:

- Formally and informally enhancing the role of the supervisory committee
- A mandatory checklist of expectations to be discussed and agreed upon by student and supervisor
- Parallel workshops for students and supervisors on improving communication in the supervisory relationship
- 'Best Practices' documents for both student and supervisor
- Mandatory on-boarding workshops for all new supervisors
- Supervisory development presentations integrated into departmental meetings
- Offering a 'Respect in the Lab' workshop to graduate programs to enhance cross-cultural communication
- Support for students in conducting difficult conversations with supervisors
- Policy requiring supervisors to renew supervisory privileges once every five years
- 1:1 mentorship available for supervisors (from Assistant Dean for Supervisory Development)

Second, we have enhanced our student advising/case management capacity to provide appropriate and adequate assistance to international students.

- Staff position of Graduate Advisor and International Specialist created to provide individual and group advising to students, focusing on needs of international students

- Dean's office structure revised to create integrated team approach: Senior Associate Dean takes lead on student issues, works closely with Associate Dean (Student) and Graduate Advisor/International Specialist.

- Case management tracking instituted to identify 'hot spots' and trends

- Established web of 'warm referrals' among campus support offices (Ombuds, Wellness, Student Success)

- Extended Orientation (Grad XO) programming offered for incoming students (all welcome, but focused on international students) throughout academic year, addressing issues of supervision, academic adjustment, effective communication.

Although both sets of initiatives are less than 5 years from first implementation, they have resulted in significant improvements in student satisfaction on key items, as measured by the Canadian Graduate and Professional Student Survey.

4: Globalization

France-Quebec Cooperation in University Education: The Emergence and Development of Dual Master's Degrees

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In recent years in Quebec and in France there has been strong interest in creating and implementing dual master's programs to support the internationalization of education.

Since the mid-1960s, France and Quebec have enjoyed a fruitful academic teaching and research relationship. This cooperation is supported and encouraged by CPCFQ (Commission permanente de coopération franco-québécoise). Created in 1965, CPCFQ is the main organization through which the commitments of the Québec and French governments are implemented. The commission has its own budget and regularly holds working sessions to foster dialogue. The relationship between the two countries is well established and is conducive to the development of dual master's programs.

These programs are similar to joint programs but differ in that they do not lead to a joint degree as such, i.e., a single document issued on behalf of two partner schools, but rather a dual degree whereby students receive a diploma from both their home university and the partner institution.

The creation of such dual master's programs is strategic for both partner schools. Unlike cotutelle[1] doctorates, governed by special agreements negotiated individually and usually at the student's request, dual master's degrees require agreements that result in a permanent dual program, offered jointly.

These programs also strengthen existing partnerships between universities, such as research collaboration, student mobility agreements, and cotutelle doctorates. They promote student mobility and are designed to emphasize the degree more than the student, taking the idea of cotutelles to the next level. They lead to formal partnerships for managing studies, which in turn fosters research collaboration. Dual master's programs involve more than simply issuing two master's degrees for one dissertation. The courses of study are developed jointly and recognized by both partner institutions, under the supervision of two study directors. Two degrees are awarded because students complete a course of study that meets the requirements of both programs.

A survey of best practices in developing dual and joint international programs found that in Canada as a whole, France is the most common foreign partner university, followed by Germany and China.[2]

In Quebec, this trend is even more noticeable. The creation of dual degree programs stems

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1   Cotutelle is an agreement on joint supervision on the doctoral degree level. The program originated in France, hence the term cotutelle (as in co-tutoring).

2   Fred L. Hall, "Best Practices Regarding International Dual/Double and Joint Degrees," Canadian Association of Graduate Studies (online). March 2012

from a variety of factors based mainly, but not exclusively, on cooperation between France and Quebec.

More specifically at INRS, dual master's programs can count on a strong contingent of French students (25%), numerous cotutelle doctorates, joint laboratories recognized by the French government as a designated "International Associated Laboratory," as well as a large number of professor and student exchange programs.

INRS intends to continue to develop dual master's programs in the near future because of the many benefits they offer students. Thanks to their international scope, these programs provide a unique cultural experience while fostering the acquisition of unique and diverse skills conducive to a research career (maturity, understanding of another country's culture and challenges, broader view of the profession, and so on). Furthermore, we can assume that having two degrees from two jurisdictions makes students more employable, as their education is more widely recognized.

Universities also reap the benefit. The creation of dual degree programs opens up new possibilities for recruitment by increasing the appeal of a school's programs while expanding the educational opportunities. Universities are able to offer students a wider choice of courses and specialties drawing on partner institutions' complementary strengths in education and research.

By encouraging international mobility among students, dual master's programs foster the creation and development of cooperation between the two partner universities. Such programs also generate regular intakes of students who can benefit from the strengths of programs offered by the two partner institutions, and serve to initiate a dialogue between the research professors leading the programs.

Globalization and the Internationalization of Doctoral Education in a Latin American Context: The case of the Pontifical Catholic University of Chile (PUC)

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In Chile we are still struggling to implement a necessary education reform to resolve insufficient access, enhance equity, quality and relevance. Considering that English is the current common language of communication in both research and teaching to stay connected with the rest of the world, being a Spanish speaking country, the students with a low proficiency of English do not have equal access to international mobility opportunities.

Research can no longer be thought of as solely local or be kept solely inside academic walls. Since our students must be educated to define and solve societal problems both at home and abroad — collectively, in trans-, multi-, and interdisciplinary and international groups, since 2014 we are preparing our doctoral students adequately to meet the challenges of globalization and the challenges of an increasing national interest in the role of doctoral education for the knowledge economy through English language training and general skills training.

One of the six specific axes of our institutional development plan of 2015-2020 is titled "internationalization to participate in a global world." Throughout the years, PUC has established a strategy to consolidate a leading position on a regional and international level, mainly through internationalization of graduate programs and the strengthening of research. Moreover, the university has created strategic relationships with prestigious higher education institutions around the world.

In graduate programs, 27 percent of PhD students and 17 percent of masters' students are international, and 50 percent of research articles are co-authored with professors from abroad. The 2017 incoming doctoral cohort, with 31 percent foreign students, was our largest intake of international doctoral students so far, and also Chile's largest fraction of international students in any doctoral program.

The value we assign to receiving international students lies with the opportunity for our students to share and debate with students from all over the world. Additionally, faculty will have the opportunity to have students of excellence and different cultures in their classes and face the challenges this implies. Exchange also provides opportunities for the development of important cooperation links as well as resources for teaching and research.

With support from the Ministry of Education through two Performance- based Agreements (PBAs) focusing on producing significant Higher Education results in selected areas such as the **Internationalisation of Doctoral Education**, in 2013 our university took advantage to strengthen the international capacity of its Doctoral College with a main focus on the internationalization of six of its most competitive PhD programs in the field of Science and Technology (Physics, Astrophysics, Ecology, Chemistry, Civil Engineering and Agricultural Science).

Its main objective was to improve our connections to universities of other countries and regions through activities such as the organization of joint seminars and workshops with strategic partners, double degree arrangements, attracting students from other Latin American countries and promoting joint research through academic missions and summer or winter schools.

In December 2015, together with the University of Chile, our university was invited by the Ministry of Education to elaborate a 3-year proposal focusing on the establishment of a strategy and institutional structure for internationalization with a particular focus on institutional capacity building, research priority areas and doctoral education. Additionally, both universities were required to join forces to position Chile in doctoral education and research fields of strength and common interest through the establishment of strategic priorities, the organization of joint seminars with international institutions, summer and winter schools and assistance to study fairs in Latina American countries.

Participation in Universitas U21, a global university network
Since 2013, we are member of this global network of 25 research intensive universities and participate actively in the Group of Research Leaders and the group of Deans and Directors of Graduate Studies of these universities.

Through yearly formal meetings of both groups current issues relevant to all the members are discussed, benchmarking and good practices, ideas and information are shared across the membership as well as through thematic workshops and joint or double degrees which build on the complementary strengths of member universities.

DDoGS have formed a group to enable the sharing of ideas, practices, information, and enhancing knowledge, contacts, and the skills-base across our membership.

We aim to identify ways in which U21 members can support each other and, ideally, share resources in areas such as professional development materials or programmes, information systems, and core policies and procedures.

Challenges:
1. Emphasize the need to position internationalization into the core instead of maintaining a marginal position in the university.
2. Focus on cooperation and exchange within the region of Latin-America and the Caribbean. The Association of the Montevideo Group (AUGM) in which public universities in the Mercosur region work together and exchange students and staff and stimulate other forms of cooperation is a good example.
3. Make the Colombian annual Latin-American and Caribbean Higher Education Conference LACHEC supported by the Colombian Government for several years (since 2012) a regional event.

How Do We Get There from Here and Why Should We Do It?: Facilitating Graduate Curricula Change

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The University of Hong Kong (HKU)'s ambition into the next decade is to be Asia's Global University. According to the Times Higher Education 2016, HKU was ranked third globally in "international outlook". Currently, HKU hosts a diversity of students from over 60 nationalities. There are some ~10,000 non-local students comprising ~34% of the total student population on campus at any one time, creating ample opportunity for all students on campus to be exposed to various cultures. The number of incoming exchange students will grow further as HKU expands its liaisons with partners abroad in the coming decade. Last year, HKU sent some 3,500 students abroad, the majority of them being undergraduates.

To catch up, the Graduate School at HKU has launched a pilot scheme for internationalization from 2016. Furthermore, in HKU's Academic Development Plan (2016-19), *"Internationalization"* is one of the university's key strategies for the next decade. To internationalize doctoral education at HKU, the Graduate School and Faculties have agreed to share responsibility in targeting by 2019, 50% of PhD students in attaining an experience outside Hong Kong, and by 2022, 100%. Besides the many exchanges arising from collaborations at the grassroots between each research student supervisor and a collaborator abroad, HKU sends groups of students to learn at various universities all over the world. Examples from the Faculty of Arts include summer sessions at Cornell University and King's College London. Destination targets for the Faculty of Medicine comprise workshops and courses organized by the Institut Pasteur (France), Cold Spring Harbor Laboratory (USA), Marine Biology Laboratory (Woods Hole, USA), Wellcome Trust Sangar Institute (UK), Neuroscience School of Advanced Studies (Italy), European Molecular Biology Laboratory (EMBL in Germany and UK), European Molecular Biology Organization (EMBO in Germany, the UK, South Africa, Turkey, Italy, France, Austria, China, Spain, Switzerland and Portugal), Federation of European Biochemical Societies (FEBS in Armenia, Greece, Germany, Czech Republic, The Netherlands, Spain, France, and Israel), and the International Society for Stem Cell Research (ISSCR in Canada, USA, Germany, UK, Denmark, Spain, Greece). The Faculty of Science has proposed a marine ecology excursion in Tsitsikamma in South Africa while the Faculty of Social Sciences has organized an Inter-university Consortium for Political and Social Research Summer Program at the University of Michigan, and an International Political Science Association Summer School at the National University of Singapore.

HKU has taken advantage of its global partners in promoting internationalization in doctoral education through joint PhD programmes. Currently, HKU offers a joint PhD degree with King's College London, a Joint Educational Placement for PhD with the University of Toronto, and a Joint Education Programme for PhD with the Southern University of Science and Technology. In such programmes, available across a wide range of disciplines, the student spends half the study period in the partner university and benefits from being exposed to learning and research experiences that generate long-term benefits beyond graduation. Each student should be able to reap rewards from the shared research excellence between

HKU and the partner university, and would subsequently gain a better professional network.

Global ties have also been achieved through HKU's participation with the Association of Pacific Rim Universities, the Council of Graduate Schools, and Universitas 21 of which HKU is a founding member. The U21 3 Minute Thesis (3MT) Grand Final competition has promoted inter-university participation at a global virtual event since 2013, when doctoral students selected from each member university showcase their research to a general audience in videos that are accessible throughout the network. This has created opportunities to share research carried out in each U21 partner that may subsequently enhance ties amongst members. In contrast, the recently launched U21 Graduate Collaborative Research Awards require at least three U21 partners, from two or more countries, to collaborate. It brings young researchers from across the globe together in solving research problems. These doctoral students will gain in the development of transferable skills as well as ability to work across cultural divides.

The U21 Graduate Collaborative Research Awards represent a new and promising model for international partnership in research and education because doctoral students are encouraged to implement global research collaboration relatively early in their research life. One of the aims is for team participants to sustain a lasting collaboration within the U21 network. The projects that are supported can arise from any one discipline or could be interdisciplinary in nature. The students are also expected to disseminate their research output publically, promoting a culture of sharing research data. Of the seven projects funded in the pilot round in 2016, three were led by HKU, involving the Faculty of Arts (with Ohio State University and University of British Columbia), Faculty of Medicine (with Ohio State University, Shanghai Jiao Tong University and the University of Glasgow) and Faculty of Social Sciences (with the National University of Singapore, University of Queensland and the University of Auckland).

U21 has been a successful network because it has under 30 members, and will not face difficulties that arise with larger partnerships. It is always harder to communicate with a larger group as some members may be perpetually active while others remain dormant. Thus groups that remain limited in their ability to reap the benefits of international mobility may be the larger ones. Smaller groups naturally tend to interact better, especially so when they share common interests and focused outcomes. Challenges in larger groupings may also include problems in keeping up with partners to retain ties.

HKU hosts many prestigious Hong Kong Postgraduate Fellowship awardees that are funded by the Hong Kong Research Grants Council, many of whom come from abroad. However, internationalization on campus and the integration of international students at HKU has posed challenges including the tendency for certain groups to stay apart. These problems in segregation emerge when students adhere to their own cultural groups without venturing out of their comfort zone. Thus HKU is working hard to resolve these issues by striving to attain a good mix of undergraduate and doctoral students from different nationalities in its residential colleges. Attempts to integrate local and non-local students have also been made through student societies and in keeping study groups of doctoral students diversified.

How University College Dublin Takes Advantage of Connections to Other Countries and Regions

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Globalization is one of UCD's key strategic initiatives. To deliver on this initiative, the UCD Global Engagement Strategy sets out to 'further enhance our international culture, grow our global reputation and increase the impact of our excellence in scholarship, research and innovation on key global issues'. The realisation of UCD's global ambitions is supported by the Vice-President for Global Engagement and UCD's Global Centres in North America, China, India, South East Asia and the latest Centre to open in Dubai in 2018. UCD has significant overseas programmes in China, Malaysia and Hong Kong. UCD's global outlook is evident in many of its Research Centres and Institutes, for example the Centre for Humanitarian Action, Australian Studies Centre, Clinton Institute, James Joyce Research Centre, Centre for Canadian Studies, Institute for British Irish Studies (IBIS), Dublin European Institute, the Confucius Institute etc.

UCD also has strong links with a number of international networks: Universitas 21, UNICA - Network of Universities from the Capitals of Europe, the European University Association and International Association of Universities, Conference of European Schools for Advanced Engineering Education and Research (CESAER), and Network on Humanitarian Action - International Association of Universities (NOHA). EU funding, through Erasmus Mundus for staff & students, expires in 2018 and will be replaced by International Credit Mobility (bilateral agreements with Israel, Lebanon, Japan, Hong Kong, Vietnam, India, Rwanda, Kenya etc.).

Of the networks listed above the U21 network and partnerships have been particularly important for graduate education. The development of joint PhDs has been very important, where two partner universities create a tailor-made programme of study for a student, taking individual research needs into account and enabling collaboration with another university in the network. Joint PhDs considerably enhance students' research and employability on an international scale. Another important development has been the researcher supervisor support development programme in UCD, which has resulted from sharing best practice within the U21 network. UCD carried out a review of supports and practices in 5 U21 partners, the first initiative of its kind in the U21 network on research and supervision.

In addition, following a period of restructuring of the Doctorate in Ireland, UCD as part of a multi-institutional collaboration, developed a National Institutional Framework which acts as a guide for institutions considering programme development for research supervision.

Are there new and promising models of international partnership in research and education?

UCD International, under the Vice-President for Global Engagement is exploring diversifying the types of sustainable international partnerships the university enters into. UCD is especially looking at Double Degrees, Joint Research Degrees and short-term student mobility options.

Are there types of international partnership that are becoming less important at your university?

UCD as a whole aims to make sure that any partnerships we have are productive and sustainable. In that sense, UCD is moving away from signing MOUs that don't show a potential towards continued, sustainable engagement. To this end, new partnerships need to be reviewed by the UCD Global Engagement Group. The Global Engagement Group was established to provide high-level oversight and coordination of the University's globalisation activities and provide advice to the University Management Team on matters relating to UCD's global engagement.The UCD Global Engagement Group is tasked with developing UCD's international agenda through international student recruitment, internationalising the curriculum, developing global centres, promtoing student and staff mobility. In addition, the group provides institutional oversight of external environment activities (e.g. policies, regulations) that impact on UCD's global engagement activities and ambitions.

Which groups remain limited in their ability to reap the benefits of international mobility for graduate study?

A major challenge is the mobility of UCD's graduate research students, both masters and PhDs. A significant barrier is the cost of mobility. In addtion, mature students enrolled on taught or research programmes, with family and childcare issues, often are unable to avail of the benefits of international mobility. Few funded PhDs will have a budget for international mobility unless it formed part of the grant proposal. An additional barrier may be the supervisor, who does not encourage or see the value of international mobility as part of the graduate experience. Undergraduate mobilty is encouraged and supported by the institution. The same level of institutional support is not eveident at graduate level. All undergraduate programmes in UCD offer international mobility.

What other challenges remain?

Capturing the international activity in UCD has to date been difficult however a Global Partnerships content management systmem is in test phase, this will collect all contact information with international universities/partnerships from programme collaborations, MOUs, visits and partnerships etc. This web based data system is due to be presented by Vice President Global Engagement to Global Engagement Group in September and the University Management Team in October, to be rolled out university wide once approved. It is envisaged that the database will facilitate greater graduate and research mobility. Other challenges include inadequqte funding, access for mature students to graduate education, getting Irish students to engage with non-Anglophone countries and PhDs need very specific mobility placement to ensure the mobility enhances their research.

From Outbound Globalization to Inbound Globalization: The Case of the Graduate School of International Studies, Yonsei University

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Yonsei University's Graduate School of International Studies (GSIS) opened in 1987 as Korea's first English-speaking degree program at a university. What is the meaning of the GSIS experiment? I believe that the historic significance of GSIS must be understood in the context of globalization.

In 1987, the GSIS was Yonsei's answer to the challenge of globalization. Before I turn to the GSIS's role, it is important to give a bit of background on Yonsei University. Yonsei University has always led the internationalization of higher education in Korea. It was the first Western-style university in Korea, founded by a man bearing the first word of our name, Mr. Underwood. Since its founding, Yonsei has registered many accomplishments in international education. It was the first to initiate an international student exchange program, and also the first to establish Underwood International College (UIC), a college of international liberal arts in 2005.

Continuing its pioneering tradition, Yonsei University established the GSIS in 1987. For Yonsei University, the GSIS is more than a separate school where instruction is conducted in English. Yonsei University conceived the GSIS as a new model of globalization that would propel Yonsei University into a truly globalized university.

What does it mean to be truly globalized? Ultimately, it is the educational outcomes that matter. A university is not truly globalized unless it produces world-class research and teaching. How to attain global standards in teaching and research is an intellectual challenge, and has been a subject of intense academic debate.

After many decades of research, there is a growing consensus that there must be globalization on both sides of the input-output equation. That is, in order to produce world-class educational outcomes, we need world-class educational inputs such as faculty, curriculum and facilities. The notion of educational input also includes organizational culture. A university must cultivate and maintain a culture of academic freedom, excellence, openness, tolerance, and discipline. Therefore, university governance has recently emerged as a key issue in the debate on university reform.

The question for a Korean university is then whether or not it can generate necessary educational inputs without foreign inputs, international teachers and students, that is, inbound globalization. In establishing the GSIS, Yonsei University affirmed its belief in inbound globalization that international students and international faculty members must be brought into Yonsei University to create a global campus.

With a global campus, a world-class education will follow. Until now, most Korean universities have been preoccupied with outbound globalization, i.e., sending their students and faculty abroad for the first-hand experience of global standard education.

The vision of inbound globalization that had guided the founding of the GSIS again became a new initiative put forth by President Jung Chang Young who began his tenure in 2004. President Jung went on to found the UIC in 2005. His vision did not stop with the UIC. He later developed the Songdo Global Academic Complex to become Yonsei's third campus in the Songdo Free Economic Zone to house 5,000 international students.

Can the GSIS/UIC be the model for the future champions of inbound globalization? To answer this question, it is important to be clear on what the GSIS/UIC model stands for. One must make two important decisions regarding inbound globalization. First is the language to be adopted as the language of instruction. The second is whether a domestic or foreign university will be the main driver of inbound globalization. The GSIS/UIC is an example of an English-based, domestic-driver model. There are other models. For example, when you invite a foreign university to open a branch campus in your country, you are pursuing a foreign-driver model.

So here you have a short overview of the history of Yonsei University's GSIS and UIC. I hope that at the end of today's workshop, we will have a much richer understanding of the relationship between forces of globalization and the universities' responses to them.

5: Workforce Demands

Australia's Research Training and Australia's Productivity: The Nexus between Research Degree Candidates and Industry Workforce

Pat Buckley
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University of South Australia

Australia's research training system was comprehensively reviewed by the Australian Council of Learned Academies (ACOLA) in 2015-2016.[1] Amongst other priorities, the ACOLA Panel was asked to examine the employability of PhD graduates and explore mechanisms for optimising a research workforce pipeline in areas of national importance. In announcing the review, the then Education Minister Christopher Pyne said: *A highly skilled research workforce is vital to Australia's future prosperity. Other countries are already exploring new research training models with more structured PhD programs, greater industry engagement and alternative pathways into a PhD.*

It's not that research training and the Australian PhD hasn't been examined in recent years. It has. But, concerned by OECD data showing that Australia lags in innovation and in university-industry collaborations, it has come under scrutiny again as the government seeks ways to upregulate researcher-industry connectivity for research productivity, innovation and transformation of the economy.

The ACOLA Panel was praiseworthy of Australia's training system, and identified as particular strengths its academic outputs, rich variety of choices in pathways, flexible entry requirements, an independent high-quality examination process and an emphasis on high quality disciplinary research and the development of associated research skills. The ACOLA Panel concurred that research training has a crucial role to play in achieving an aspiration to improve university-industry collaboration performance and, accordingly, many of the findings and recommendations of their final report focused on this.

Since then, a national Research Training Implementation Working Group has been established to develop an ACOLA review implementation plan with measures relating to the three broad categories of reform identified by the Review (regulation and policy, university cultural change, and industry incentives). At the time of writing, the Working Group will submit its final report to government within a few weeks.

As a member of that group, and without pre-empting its formal advice ahead of delivering its final report, there are some matters worth reflecting on.

The *first* is the challenge that stakeholders are having with the concept and definition of industry. For some, the definition of industry is strictly for profit and commercially oriented. For others, it has much broader meaning. The university sector subscribes to the broader

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1 McGagh, J, Marsh, H, Western, M, Thomas, P, Hastings, A, Mihailova, M, Wenham, M (2016) Review of Australia's Research Training System. Report for the Australian Council of Learned Academies, www.acola. org.au

definition of industry. The Australia Technology Network – a coalition of five universities of enterprise (QUT, University of Technology Sydney, RMIT University, University of South Australia and Curtin University) – have adopted the following broad definition.

The ATN member universities take a wide and inclusive view of industry to encompass industry, business, government, the not-for-profit sector and the professions.
The aim of ATN universities is to form partnerships with industry to shape and address research challenges, innovate and deliver benefit to society and the economy.
The ATN philosophy in research, research training and partnerships foregrounds excellence, innovation and adding value to our partners, end-users and our wider communities.

Issues of definition have implications when efforts are being made to increase 'university-industry' collaboration that have PhD candidates in the mix, and when forthcoming measures of industry engagement are being flagged for collection by government. In the latter context, 'engagement' is most efficiently measured by quantitative metrics such as number of internships or placements, so there is a tendency to reduce the 'industry engagement' of PhD candidates to a sole measurable internship.

The **second** is the volume and variety of initiatives that government, industry and universities have invested in and are engaged with, to build opportunities for PhD candidates to work with end-users, and vice versa. These can be grouped into 4 broad categories.

Broad engagement incentives into which PhD candidates can be incorporated. For example, a recent change in government leaders funding allows universities more discretion in the type and duration of scholarship support they offer.

National schemes that directly fund university-industry collaboration in research training. For example, the National Research Internships Program has been established to deliver substantial numbers of PhD placements with industry over 4 years, in STEM disciplines.

Industry schemes that provide university-industry collaboration in research & research training. For example, the national Industry Mentoring Network in STEM (IMNIS) connects motivated PhD candidates with outstanding industry leader mentors.

Industry-linked PhD programs offered by universities. For example, the ATN's Industry Doctoral Training Centre (IDTC) is an innovative Australia-wide industry research training program focused on providing solutions to real industry challenges.

The examples could continue, signalling there's considerably more of this happening than is sometimes recognised. The challenge may be less about scaling up this activity and more about broadening it to domains that have a less developed partnering culture for PhD candidates.

The **third** is that workforce diversification is accelerating, yet the lack of longitudinal data on the outcomes of Australian graduates remains a systemic problem.

Summary
It is well demonstrated that research contributes to a more secure, healthy, socially and economically prosperous future for Australia and for all Australians. However, we now

have global challenges of such scale and complexity that changed emphases in research approaches are being called for. Moreover, the connectivity between business and research needs boosting, in order to maximise the translational and economic outcomes from research. The latter has been a focus of the Australian Government for some time, most usually expressed in specific schemes to encourage university and business collaboration in research.

There are over 65,000 postgraduate research students undertaking higher research degrees in Australian universities, and about 8,000 PhD completions in a given year.

Building research training to ensure graduates can be effective contributors to multidisciplinary research investigations as well as being responsive to end-users from industry, government and community is a major focus for universities, government and industry in Australia.

Curious, Courageous, Collaborative and Connected

Lucy Johnston
Dean of Graduate Research
University of Newcastle (Australia)

He pai te tirohanga ki nga mahara mo nga raa pahemo engari ka puta te maaramatanga i runga i te titiro whakamua

It's fine to have recollections of the past but wisdom comes from being able to prepare opportunities for the future

Yesterday is gone. Tomorrow has not yet come. We have only today. Let us begin. - Mother Teresa. In this contribution, I focus on the question of how we can prepare the (doctoral) students of 2017 for the world of 2030 and beyond.

In considering this question, it is important to remember that the students of today are the creators of the world of 2030 and beyond. Over recent years, and in many Global Summits, we, as leaders of graduate education, have focused on the development of additional transferable skills for doctoral candidates, moving the focus away from the thesis to the individual as the product of doctoral education. The development of the multi-skilled individual is undoubtedly important, and sought after by employers. But we must also remember the central importance of the research carried out by doctoral candidates in shaping our collective future.   In doing so, we ensure that we maintain an emphasis in doctoral education of the creation of, and ongoing capacity to create, new knowledge. Take, for example, one of the most talked about impeding changes – that of increased automation of activities and use of robots for a multitude of domestic and professional tasks. Such change will only occur as a result of sophisticated and innovative research carried out by, among others, doctoral candidates. These candidates, through their research, will create the opportunities for the future, and in the words of the whakatauki above, show true wisdom and leadership.

So how can we prepare current doctoral candidates to develop wisdom in the creation of the opportunities for our collective future and to develop leadership to enable the embracing of these opportunities for collective gain?

One of the few certainties for the future is that it is uncertain. Perhaps the greatest skills that our students need is the ability to embrace change rather than to fear uncertainty, and to have the adaptability and agility to embrace new opportunities. To do so requires *courage*, the strength to try without the certainty of the outcome. Such courage should not be novel to doctoral graduates: as researchers they need to cross and push boundaries, to be innovative and exploratory. This is the basis of all research. The creation of new knowledge is not to go where others have gone before, but to create a new path. Throughout the doctoral journey, such sure *curiosity* and courage must be encouraged and rewarded. The role of the supervisors is to ensure that the candidate has the research and professional skills and *collaborative* networks to navigate wisely.

While much is uncertain, there can be some certainties as we gaze into our collective crystal ball. The world's population will get older, the world will become more interconnected and, as mentioned above, there will be greater automation. All of these factors, and the many more that we do not foresee, will require both technical and societal adaptation. Our doctoral graduates will be the leaders in this adaptation and development. In developing and leading the future doctoral graduates need courage, connectivity and to be able to communicate and **collaborate**. In a more interconnected future, collaboration will involve not just the mutual respect for other disciplinary approaches and methodologies but also recognition of cultural differences in the development and use of research. Such cultural awareness and integrity is a necessary for doctoral graduates, whether or not they are pursuing a research-based career.

These are not new skill requirements. In 2011 Dr Mather-L'Huillier from the University of Edinburgh wrote that *"the process of doing a PhD is often recognized as training in creativity, critical inquiry, negotiation skill, professionalism and confidence,* and these skills are being recognized and required more broadly. In Australia, there is a strong emphasis from the Commonwealth Government on greater connectivity between doctoral graduates and industry[1] and on greater communication and dissemination of research findings. Consistent with doctoral schools internationally, we have developed and extended the available training for doctoral students around communication skills. Notably such offerings have adapted in response to the changing face of global communications. The importance of peer-reviewed publication is being supplemented by the need to ensure the wider dissemination of these findings beyond the dusty university library shelves. Workshops on the development of a strong internet profile, on the effective use of social media (both for data collection and dissemination of findings) and on the use of altmetrics are now offered. This broader dissemination of research findings and greater engagement with the public is encapsulated in the coincides with the rise of "the impact agenda" within the Australian Excellence in Research Assessment (ERA), the government's measurement of the economic and societal impact of university research and the engagement of researchers with external stakeholders in the development of research projects. Future such assessment of impact and engagement will have impact on future allocation of government research block funding to Higher Educations Providers. Doctoral research and researchers are caught within this net of increased government auditing. As such, all doctoral researchers will be required to consider not only the impact of their proposed research in their specific research domain but also more broadly and will increasingly be expected to engage with stakeholders – industry, communities, government – on the co-creation of research; focusing the efforts of researchers on "real-world" problems. However, while such targeted user-driven research is important, let us not forget the benefits too of serendipitous research – the pacemaker, Teflon, the Post-It note and, of course, Viagra. As research leaders we must also ensure the facilitation of exploratory, "blue skies" research as we don't know what we don't know.

Many Australia universities, including my own, have developed opportunities for doctoral candidates to work closely with external partners, enhancing for both parties an understanding of the link between university research everyday issues. Our UNITE (University of Newcastle Industry Training and Engagement) program enables doctoral candidates to spend 3 months working on an industry-led project during the period their thesis examination. This program provides doctoral candidates with the opportunity to apply their research skills to industry-driven projects and often to work in interdisciplinary

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1 The definition of industry in this context is essentially anything that is not the university

teams. Moving forward more of the global challenges will be addressed not by the individual scientist in the laboratory, the individual historian in the archives or archeologist in the field but by large inter-disciplinary teams working together – the challenges are too big to be addressed by individuals or individual disciplines. Increased computing capacity and connectivity will also lead to greater use of shared "big data".

As discussed at previous Global Summits, both inter-disciplinary research and big-data provide opportunities and challenges in the doctoral space. Moving forward both the opportunities and the challenges will increase. More doctoral research will be carried out in large inter-disciplinary research teams but the contribution and skills of the individual doctoral researcher will be harder to identify and to assess, challenges that we collectively need to revisit and consider. Greater consideration might also be given to professional- and industry-doctorates as pathways to greater end-user engagement.

But I am optimistic; whatever the future, it will be guided and lead by doctoral graduates as has successfully been the case in the past.

Multiple Intelligences for a Changing World

Susan Porter
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Imagining the future is a delightful exercise; accurately predicting it, an impossible one. Some features of 2030 seem probable however: complexity, uncertainty, and a state of continuous change. Our most critical challenges in this century are wicked problems, with no easy definitions or solutions. Both within and outside academia, approaches to knowledge creation and definitions of knowledge continue to evolve, as a response in part to the limitations of postivistic views of knowledge and knowledge creation and to the ill-structured, complex problems of today that are resistant to reductionistic solutions. The linear model of technological innovation is largely discredited, and there is a growing appreciation of more open modes, involving complex intersectoral and interdisciplinary interactions, and alternative starting points and methodologies.

How will our graduates be best prepared for this? Common attributes have been identified by many. Graduates need to be able to live with uncertainty and ambiguity, to 'move forward' problems that involve multiple domains and disciplines, to take approaches that are unique to the problem, to collaborate effectively, to think across disciplinary boundaries. Importantly, they will need to be able to adapt effectively to change – changing workplaces, contexts, problems, approaches, and ways of thinking and acting.

Graduate education enables individuals to gain profound knowledge and thinking abilities. But we've known for some time that these gains aren't always sufficient for the challenges they face after graduation, and arguably, this gap will only widen by 2030 without changes in the way we think about graduate education. For several decades, non-university employers have said graduates are often not adept at adapting to 'real world' environments, that they are too specialized, theoretical, and/or technically-minded, that they lack communication and teamwork skills. Even as recently as last year, our own survey of potential employers outside of academia have reiterated these and other concerns: PhDs are often 'linear-thinking' (when the world requires non-linearity); they don't often understand the ethos or needs of other sectors; they struggle approaching open-ended problems that don't look like anything they've seen before (in one respondent's words, "the 'figure it out' nature of most projects").

The current response to these deficiencies is an itemization of the 'skills' graduates lack – communication and business-related skills heading the list – and the development of a curriculum or experiential learning opportunities to provide them. I and others have argued[1] that such responses are simplistic, in part because the term 'skill' is often undefined and ill-examined. This imprecision is arguably most problematic because it doesn't enable a thoughtful tailoring of pedagogical approaches to the very distinct and nuanced qualities sought.

I have found two overlapping conceptual terminologies to be helpful in defining the needed attributes of graduates, and of imagining the graduate pedagogies of the future. The first is that of 'capability'. As defined here, capability, versus the lower order abilities of compe-

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[1] Porter S and Phelps J (2014). Beyond Skills: An Integrative Approach to Doctoral Student Preparation for Diverse Careers. *Canadian Journal of Higher Education*, 44, 54-67

tency and skill, is the capacity to take 'effective and appropriate action within unfamiliar and changing circumstances', involving 'judgments, values, the self-confidence to take risks and a commitment to learn from the experience'.[2] The concept has been developed extensively in the field of health professional education, but there are clear parallels with graduate education as it relates to the above concerns.

The second conceptual terminology is that of Sternberg's triarchic model of intelligence (or 'successful intelligence').[3] This model posits three forms of intelligence – analytical, creative, and practical – that rely on distinct forms of knowledge and cognitive processes. Individuals successful in life with high levels of expertise are said to have all three intelligences in abundance. Practical intelligence is the ability to acquire and apply in real world settings the form of knowledge often gained subconsciously through experience (tacit knowledge[4]), to solve problems which are poorly defined and lacking in sufficient information to easily identify strategic solutions, the 'mental activity involved in attaining fit to context'. Creative intelligence uses divergent and synthetic thinking and enables one to invent, predict, and creatively address problems with open-ended solutions. Graduate students generally have high analytical intelligence and formal knowledge, but aren't necessarily strong in the other forms. Doctoral students who transition easily to independence, and exhibit innovative scholarship have higher levels of creative and practical intelligence than those who produced 'undistinguished' scholarship,[5] even though the latter group often exhibit high analytical intelligence. High levels of capability, as defined above, requires all three forms of intelligence.

Fortunately for all of us, although general intelligence is relatively stable, practical and creative intelligence (and capability) can be enhanced. A key way to develop these attributes is through 'effortful experience' – that is, through experiencing new environments, contexts, or ways of thinking while consciously acquiring relevant tacit knowledge, and reflecting on what one is doing and why. Methods that train individuals in the relevant cognitive processes and that facilitate reflective analysis have shown some success in improved learning from experience.[6] A promising program for doctoral students at Stanford University (*Research as Design*)[7] seeks to enhance creative intelligence by facilitating students' experience of design thinking as it relates to their research problems. Students are able to adopt design mindsets (at least in the short-term) through multidisciplinary collaborative problem-solving, taking 'action-oriented' approaches, embracing uncertainty, failure, and experimentation, and learning to be mindful and reflective of the process. Interdisciplinary inquiry has parallels with these approaches, and is also associated with enhanced creativity and adaptability.[8]

The current curricula that focus on discrete skills, although valuable, are not designed to promote the significant development of capability. Experiential learning opportunities, such

2 Stephenson (1992). Capability and Quality in Higher Education. In *Quality in Learning* (ed. J. Stephenson and S. Weil). Kogan Page, London.
3 Sternberg RJ (1985) *Beyond IQ: A Triarchic Theory of Intelligence*. Cambridge University Press, Cambridge.
4 Polanyi M (1966) *The Tacit Dimension*. Doubleday, New York
5 Lovitts BE (2008) The Transition to Independent Research: Who Makes It, Who Doesn't, and Why. *The Journal of Higher Education, 79*, 296-325.
6 See Cianciolo AT, Matthew C, Sternberg RJ & Wagner RK (2012) Tacit Knowledge, Practical Intelligence, and Expertise. In *The Cambridge Handbook of Expertise and Expert Performance* (eds. KA Ericsson et al). Cambridge University Press, Cambridge.
7 Ulibarri N et al. (2014) Research as Design: Developing Creative Confidence in Doctoral Students Through Design Thinking. *International Journal of Doctoral Studies, 9*, 249-270.
8 See Ivanitskaya L et al. (2002) Interdisciplinary Learning: Process and Outcomes. *Innovative Higher Education 27*, 95-111.

as internships, would have more of an impact in that domain, however, these opportunities don't generally entail an evaluation of students' learning, scholarship, and performance, nor are they usually embedded within a learning framework. They are also typically dissociated from the dissertation and the students' deepest learning, which doesn't promote the formation of meaningful connections or enriched dissertation scholarship. They are also not considered valuable enough to be required, or to even count toward the degree credential. In addition to these avenues, therefore, can we not imagine program-integrated approaches more directed at developing the successful intelligence needed for the 21st century?

At UBC, we are in our third year of an experimental program, the [Public Scholars Initiative](#) (PSI), intended, at least in part, to do just that. The PSI supports doctoral students from across the university who wish to broaden their dissertation research to contribute more directly to the public good, engaging novel approaches, methodologies, collaborative partners, contexts, and disciplinary perspectives to address messy problems. Related non-traditional scholarly products, such as film, policy papers, and reports are also included in the dissertation. We have found through conversations and anonymous surveys that students frequently find a new excitement and creativity about their work; they think about their research in novel ways, become more aware of the ethical and social dimensions of complex scholarship, and have increased confidence in working in disparate environments. Through their PSI-supported research and professional development, students have said they gained the ability to 'see broader connections', and to 'really understand what was going on'. Others have said, 'it allowed me to be creative and to ask questions I didn't think I'd be able to', 'it enabled me to forge a more ambitious path for my dissertation', it 'opened up a vast and rich research terrain I never anticipated', it 'broadened my abilities', and it 'gave a big creative and intellectual boost of confidence'.

We believe engagement in these broader forms of dissertation work enhance 'successful intelligence', and that students' research is stronger and more impactful for it. We are considering building on others' research described above to further improve learning from these experiences, and have developed smaller-scale projects to enable broader accessibility to these forms of learning. From a societal perspective, many PSI students said that the type of expanded scholarship they are pursuing is essential for the future health of the academy and society. As one student said: 'Keep pushing. This is gold, this is the future.'

2030: The Fourth Industrial Revolution and the Liberal Arts

Christopher Sindt
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We are at the beginning of what the World Economic Forum calls the "Fourth Industrial Revolution," a transformation of the world and the workforce brought on by the growing influence of artificial intelligence, bio- and nano-technology, robotics, and advanced computing. These developing fields will coalesce to create smart systems that drive the way factories, farms, homes and towns are designed, and the way they respond to problems and challenges. Climate change, shifting immigration patterns and the evolving global economy will also impact the way human beings interact and share resources. Corporations, governments and communities will need to find new ways to adjust to this shifting landscape. And while new occupations will emerge, most current occupations will undergo fundamental transformation.

The WEF describes a set of evolving conditions that will impact work in the Fourth Industrial Revolution: New technologies will make work environments more flexible and lead to fewer core workers and more contract employees; there will be a shift to emerging economies for the growth of the middle class (i.e., Asia will account for 66% of the global middle class by 2030); changes brought on by climate change will force corporations and governments to search for innovation to stem the tide of resource depletion and the degradation of ecosystems; the mobile internet and cloud technologies will allow for the rapid spread of internet-based services; advances in computing power and big data will make it necessary to put in place systems to process and convert to action all the new data; new energy supplies (wind, solar, fracking) will transform the traditional energy infrastructure.

This evolving environment calls for less specific knowledge of aging technologies and industries, such as oil; complex problem solving in industries that are highly technical—such as computing and energy—as certain tasks become automated; technical skills, such as programming; and positions requiring physical strength. Instead, we need new knowledge and new skills: Complex problem solving in areas such as professional services and communications; social skills, such as persuasion, emotional intelligence and teaching; content skills, such as creativity and cognitive learning; and process skills, such as active listening. In a professional context where the only constant is change, graduates of our institutions need targeted disciplinary expertise combined with what in recent years had been called, "soft skills," the ability to be adaptable, creative, collaborative, capable of lifelong learning, capable of building strong relationships, and able to work effectively in groups across national, racial and ethnic difference.

According to *Business Insider*, the primary fields in the United States in the years leading up to 2030 include medicine and health (surgeons, nurses, physical therapists), computer science (both systems and software), management, accounting, marketing and sales, law, and teaching (especially elementary school)—all degrees that require many of the soft skills mentioned above.

In order to support success for 2030, university leaders will need to promote interdisciplinary and collaborative learning at all levels; we will need to break down the arbitrary binary between the humanities and sciences, as well as the binary between pure and applied sciences; we will need to design certificate programs for extremely specific technical training while emphasizing soft skills as appropriate for the field.

Universities should also lead the way in an evolution of primary and secondary education that prepares students at an early age for these human skills—such as empathy, problem-solving and collaboration—providing research that supports effective pedagogies. At the undergraduate level, we should emphasize a strong liberal arts base, significant study in the humanities, social sciences and natural sciences, in order to provide a breadth of knowledge and the ability to integrate and synthesize learning. The liberal arts tradition enables students through shared inquiry to become thoughtful, engaged citizens, citizens who know that learning continues after graduation, citizens who know how to ask what, how *and* why. At the doctoral level, universities should continue to focus on developing new knowledge as its primary driver while also exploring the soft skills needed for high quality university teaching or the careers associated with professional doctorates.

In the United States, masters' degrees are projected to account for 39% of all new degrees granted during the next decade. This growth is due in part to evolving demographics, increasing entry-level requirements in some professions, and especially the need for many mid-career professionals to retrain or switch jobs. The professional masters' degree increasingly emphasizes soft skills, such as the ability to manage, communicate, and navigate governmental and regulatory environments.

Increasingly, universities are aligning these soft skills with learning outcomes. The Bologna framework includes transversal skills (lifelong learning and initiative taking) and entrepreneurship. In the United States, the Degree Qualifications Profile emphasizes applied learning as well as civic and global learning, ethical reasoning, and engaging in diverse perspectives at the masters' level. At Saint Mary's College of California, an institution built on both Catholic and liberal arts traditions, masters' level outcomes include integrative knowledge, intercultural communication, shared inquiry, engagement with the common good, diversity, and global impact.

Global success in 2030 depends on the ability of universities to provide a strong liberal arts base, provide high quality skills development in small delivery modules—such as certificates and badges—and above all, to incorporate at the masters' and doctoral level the hard-to-learn soft skills that will respond to the complex needs of the future.

Employment Outcomes for PhD Graduates and Preparedness for the Workplace

Rachel Spronken-Smith
Dean of the Graduate Research School
University of Otago (New Zealand)

The University of Otago is a research-intensive university in New Zealand with approximately 20,000 students including 1300 doctoral students. The PhD programme at Otago is a three-four year research-only degree, although optional papers can be taken in the first year of study. The University is proud of excellent PhD completion data with 83% of candidates submitting their thesis for examination, and a median time to submission for full-timers of 3.4 years (Spronken-Smith, Cameron & Quigg, 2017). In 2015, the University of Otago adopted a graduate profile for PhDs, which includes both affective attributes e.g., global perspective and lifelong learning, and attributes highly relevant for the workplace such as communication, ethics, and teamwork etc. As well as acquiring graduate attributes through their research activities, there are opportunities for generic skills development through a university-wide workshop programme (e.g., written and oral communication; research ethics etc.), and short courses (e.g., commercialising research, preparing for academic careers etc.). A few PhD candidates also undertake internships during their candidature.

Because we had introduced a graduate profile, it was important to ascertain whether PhD graduates felt they were acquiring the set of attributes, and how well this matched their perceptions of skills required in their workplace. Thus, in 2015, we surveyed 247 PhD graduates about 18 months after their graduation. The PhD graduates were from health science, science, humanities, and commerce disciplines, with 136 responding (55% response rate). A section of the survey concerned current employment and the development and application of graduate attributes.

Figure 1 (next page) shows the career PhD graduates had in mind when they completed their doctorate, together with the job they were in at the time of the survey. Approximately 55% of the graduates hoped to obtain a career in academia, but only 30% managed to do so. However, 42% did gain a job in research in higher education, which was much higher than the 15% who had this career in mind. Only 6% gained a position in research outside of higher education, compared to 11% having this in mind upon graduation. More graduates ended up in other professional careers, than expected (23% vs 11%). Ninety-three percent said their employment was at least somewhat related to their study.

Regarding development of graduate attributes, graduates indicated the highest ratings for research and written communication skills, followed by academic rigour, the skills to plan my own work, problem-solving, independent judgement and flexibility and adaptability (Figure 2). There were several attributes that graduates perceived were applied more in their workplaces, than had been developed during university, including teamwork skills, self-confidence and the skills to implement change, willingness to learn and cultural understanding. Conversely, a very good match was noted between development and use in the workplace of research skills, written communication skills, analytical skills, environmental literacy, academic rigour, an awareness of ethical issues, and information literacy. We found strong disciplinary differences in terms of the perceived alignment (or a lack of) between the development and

application of graduate attributes. In addition, the alignment varied according to the workplace of the PhD graduate. The findings can be used to help tailor programmes to better foster the development of graduate attributes so doctoral graduates are well equipped for employment.
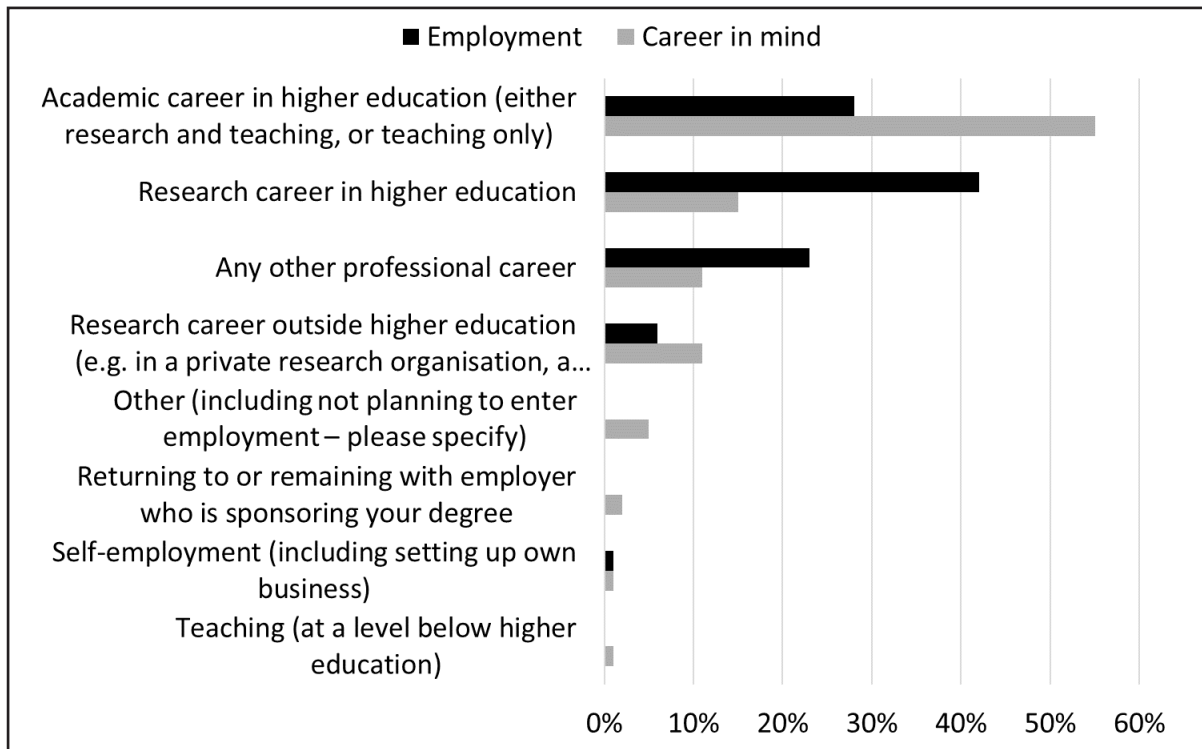

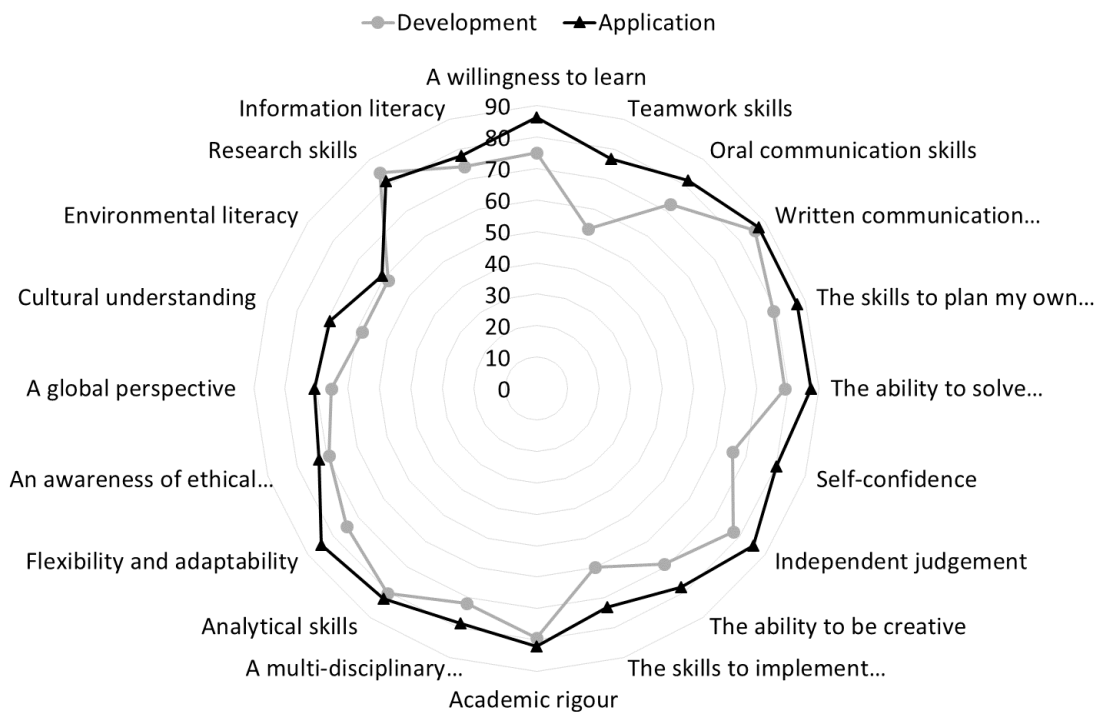**Figure 1: Employment outcomes vs expectations (n= 114, 133 respectively)**

Figure 2. Development and application of graduate attributes – all doctoral graduates (n=108 to 130)

6: Conceptualizing the University

The Doctorate – University in a Nutshell?

Hans-Joachim Bungartz
Graduate Dean
Technical University of Munich (Germany)

The whole university involved

In summarizing my now four years as TUM Graduate Dean and head of TUM Graduate School (TUM-GS), I sometimes tend to say, "*TUM reflects what doctoral education at TUM is, and doctoral education at TUM reflects what TUM represents as a whole*". Actually, both the amount and the intensity of intra-university relations at TUM-GS (here taken as a representative of the whole doctoral system) are unrivaled: the research output of our approximately 5,500 doctoral candidates is the backbone of TUM research; our recent move towards a more structured doctoral education with course offers for subject-oriented topics and transferable skills as well as the significant contributions of our doctoral candidates to teaching imply strong links to education; if there are new upcoming international university partnerships, joint PhD activities are typically among the first to be explored; most of our technology transfer happens in research collaborations with industry – research done by doctoral candidates; inter-sectoral collaboration becomes most visible in collaborative doctorates, for example with universities of applied sciences or non-university research institutions (Helmholtz or Max Planck institutes); international research orientation and collaboration have become significantly more visible as a result of the different training programs (international research stay, international Research Training Groups) and research activities of TUM-GS with its 25 doctoral programs; ethical (good scientific practice, responsibility), legal (intellectual property, publishing, insurances), and societal issues (societal impact and compatibility) are very explicit in the agenda of TUM-GS; the new Science Management Qualification Program (SMQP) of TUM-GS is about to be used as a blue-print for TUM's HR development activities; and even in terms of IT infrastructure, the design and implementation of our doctoral management system DocGS constitute one of the most advanced administrative IT projects of TUM.

Some examples

A few examples illustrate how TUM-GS or the TUM doctoral system on the whole is strongly influenced by the university's strategic initiatives – and at the same time a driving force of those:

- **EuroTech** is the alliance of currently four leading European technical universities (DTU Copenhagen (Denmark), TU Eindhoven (The Netherlands), EPFL Lausanne (Switzerland), and TUM). Collaboration happens at many levels – in strategic circles and very concrete research projects. In fact, the most intense collaboration is related to doctoral education: The Graduate Deans meet once a year, the respective staff has regular video conferences, and the speakers of the doctoral councils are in contact across the universities. We developed a joint doctoral course database and a format where doctoral candidates can apply for organizing joint summer schools with the participation of at least two of the partner universities – the second round of applications is open until September 30 of this year.

- **GlobalTech** is a similar alliance, but at a global scale. Likewise, the activities resulting from a Graduate Deans' meeting last summer (such as a first Summer School on "Cities of the future", organized by Imperial College London and TUM, with 50 participants from across GlobalTech universities) form the backbone of the alliance's current activities.

- **Intellectual property**: In the context of our three-month research stay abroad (which is an offer to all our PhD candidates), we experienced an increased level of complexity in terms of IP rights (who owns the possible outcome?). This was the starting point for re-thinking the IP formulations in collaborative agreements.

- **Collaborative doctorates**: While the majority of collaborative doctoral research projects (with external research institutions or industry) are being carried out on the university's premises, some also exist where doctoral researchers are being integrated into external workspaces and labs. TUM-GS has initiated a cross-institutional working group for involved parties in the greater Munich area that resulted in the publication of a handbook of best practices in collaborative doctoral education – which now serves as a reference in a national debate on the pros and cons of collaborative doctorates.

- **HR development**: While the doctorate used to be a solitary scientific training element for centuries, recent societal developments have put it in the larger context of consistent HR development at universities. Interfaces with the bachelor and master as well as postdoc phases, interference from scholarship agencies and unions as well as the general political debates have an impact on the TUM doctoral system and offer new creative possibilities. TUM-GS is involved in processes at the university, national, and international levels.

- **Technology and Society**: TUM-GS has spearheaded TUM's development towards improved relations of technology and society by setting up interdisciplinary and transdisciplinary doctoral research and training programs. It is now fulfilling its role as the central hub for scientific collaboration across disciplines and at institutional and national levels.

Conclusion

There are several implications of the above for doctoral education. First, the topic and its organization at the university continue to gain in importance: a successful playground can stimulate certain developments, a non-successful one may end a partnership before it really started. Second, doctoral education will leave behind its "calm island" character – any kinds of new trends or issues in international research will pop up in the Graduate School and require immediately attention and action. This will, third, lead to an increased level of dynamics, which can sometimes also be a bit disrupting to the core of doctoral projects – research. Fourth, administrative processes have to be adapted. Just to give one example: New framework agreements with companies are typically prepared and negotiated by TUM's Research and Technology Transfer unit and two legal departments (research and teaching), under the responsibility of the three SVPs Research, Teaching, and Administration. Nowadays, these contracts all contain a paragraph on collaborative doctoral projects. This needs early involvement and an institutional anchor of TUM-GS at the top university level, which has not been fully implemented yet.

On the other hand, I do not see big changes for the university's mission. Research, including doctoral research, gets more multi-faceted, yes – interdisciplinary, international, inter-sectoral. But the core mission of technical universities has always been multi-faceted, too – combining excellence in research and education with a mandate to ensure both workforce and leadership for industry and society and to address big societal challenges. The latter may be more explicit today and could even comprise aspects of Science & Technology Studies or "citizen science". It requires a more holistic (and breadth-driven) organization of research, compared to the more or less monodisciplinary (depth-loving) research approaches of earlier times – which is probably a good occasion to re-think our classical department structure that is still based on a disciplinary landscape designed by Humboldt and others, quite some time ago ...

Time to re-think graduate education? Addressing institutional, regional, and European-wide challenges

Liviu Matei
Provost and Pro-Rector
Central European University (Hungary)

Central European University (CEU) was established in 1991 as a graduate university. It aspired to become a new model of higher education institution for the Central and Eastern Europe region and beyond. One of its founding ambitions was to show the way to developing graduate education in a part of the world where this concept was then almost completely unknown. This became a surprisingly successful endeavor, also made possible by a supportive environment emerging later on with the Bologna Process.

Twenty-six years on, new developments and challenges make it necessary, this time, to re-think graduate education. On the one hand, this is becoming crucial in CEU's own institutional context. On the other hand, CEU is trying once again to play a leading role in identifying major new trends in the region and in Europe, and put in practice solutions to address them. Technically, this is happening as part of part of the process of adopting a new strategic development plan for the University. Any such process is important for the university concerned. For CEU, this time, it is not just regular planning, but an effort to re-conceptualize the University in the context of re-thinking graduate education.

I will review here briefly, combining institutional and broader perspectives, two of the most important challenges that are relevant for this re-conceptualization.

1. Re-thinking master-level education. When CEU started, there were basically no master's programs on continental Europe. Even the word "master" was not known in many European countries; it remains until today difficult to pronounce in some languages. CEU launched only master's programs at the beginning, in the early nineties, followed soon by PhD programs. For a relatively long period, it was one of the very few institutions in continental Europe and the only one in Central and Eastern Europe to offer master's degree programs. It was also probably the first to organize its PhD programs based on the concept of a graduate school. In the meanwhile, master's programs have been introduced everywhere and the expansion of master-level education is unprecedented. Basically, all institutions of higher education in Europe now offer master's degrees. Master's programs acquired a key function in the educational, but also economic, social and political context of Europe. It can even be stated that the master's program represented one of Europe's key answers to the challenges of the knowledge society. This massive expansion is accompanied by a troubling lack of conceptual clarity, not thoroughly studied so far. Its impact must be acknowledged, analyzed and dealt with. This is what CEU is currently trying to address. At present, most if not all students enrolling in bachelor's programs in Europe are expected to continue and graduate with a master-level degree, usually an MA. The question can be asked, therefore, what is the MA-level education for in times of the "master's for all"? Is it the new BA? If that is the case, shouldn't we re-think the master-level education? In addition, in most European institutions there is only one basic model or template for master's programs (the MA). Students graduating from these programs, however, make different careers and have different expectations. Some of them continue with a PhD (master's and doctoral programs are strictly

separated in continental Europe), thus see the MA as a stepping-stone towards a PhD. Others will go immediately into professions related to the subject of the program. Yet others take the MA as a kind of general education program at advanced level, not linked to a particular profession or further studies (this is a very interesting new concept emerging in Europe, de facto if not conceptualized and planned as such).

CEU proposes to address this situation by clearly recognizing three types of master's programs: "pre-doctoral", professional, and general education. This requires significant conceptual changes in the respective curricula, their relationships with the undergraduate education and with the doctoral level, and their connection with the labor market. CEU envisages that re-thinking master's education will be the most important institutional project for the next five-year period. This short analysis also points to a need to re-think master's education in Europe. CEU will try to work with other institutions to address it.

2. Combining high-level research with a social mission. In the years since the beginning of the Bologna Process (1999) - leading to the creation of the European higher Education Area, and of the Lisbon Strategy (2000) - aiming at building a European Research Area, the primary focus in European higher education has been research. This is a major factor that has supported the development of graduate education and influenced its nature in Europe. The effects have been numerous and significant, clearly positive, negative, or mixed. For example, special European-level regulations were adopted requiring that the phrase "PhD student" be abandoned and "early stage researchers" be used instead. This meant that individuals enrolled in doctoral programs were not to be considered students, who are there to learn (study), but already researchers who must produce research from year one. This approach ignores the fact that many of these individuals will never make a research career; still they are required to prepare only for that. The idea was that doctoral education should be exclusively for research (part of the very definition of European doctoral education under the Salzburg Principles). The focus on research also resulted in a certain disregard for the value of teaching, and, in a different way, for the social mission of the university. The increasing importance of research performance in rankings added to the neglect of social and mission-related aspects.

CEU was born a mission-driven university, committed to pursuing the values of the open society by a special approach to and a mix of advanced teaching and learning, high-level research, and civic commitment. This mission made CEU into a specialized, niche university. Like many universities in Europe, CEU strengthened its research capacity significantly in the late 1990's and early 2000's, and it is now a genuine research-intensive university, one of the most successful in Europe. Research excellence, which tends to be somewhat generic, and pursuing a niche, or situated social-mission do not go hand in hand automatically. A question emerged about how to conceive of this relationship. This question is relevant, in different ways, for other institutions in Central Europe and in the broader Europe as well. We at CEU, after a year of reflection and after reviewing occasionally divergent arguments decided to re-think, not abandon our open society mission. We will also re-think more generally the relationship between research, research-based teaching and learning, and civic commitment, with a significant impact on our profile and operations. How to do this is detailed in the new strategic development plan.

A key factor in reaching the conclusion to preserve a distinctive mission while remaining a graduate-only research-intensive university was the situation created by the populist

political initiatives of the Hungarian regime in 2017, including the attacks against institutions promoting academic freedom, freedom of association and freedom of speech. "Open society" and CEU itself became direct targets of these attacks. The immense wave of international support in face of these attacks, and in particular the support from the Hungarian academic community and the Hungarian public (80,000 people demonstrated in support of CEU and democracy at some point, in one of a series of demonstrations), showed that CEU's commitment to open society remains both relevant and valued in times when in the immediate region, and in many other places in the world, there is a move away from open society. CEU believes it can make a positive contribution, as a mission-driven university, through high-level research and research-based graduate-level teaching and learning.

Impact of Macau's New Law on High Education System upon Universities in Macau: Expected changes in the age of globalization

John Shijian Mo
Dean of the Graduate School
University of Macau (China)

The Law on High Education System was passed by the Macau Legislature in July 2017. It will take effect sometime in 2018. Presently, there are about 8-10 universities in Macau. The University of Macau (UM) is the largest public funded university in Macau.

In summary, the new Law has taken a more liberal approach to the regulation and administration of high education in Macau. For example, in the past, double degree program is not allowed, but the present law has opened this opportunity by allowing a registered student to transfer between different universities. Also in the past, the duration of bachelor, master and PhD program is highly regulated by law, but the new law only sets out the minimum period of studies for different levels of university degrees. Unfortunately, the new law is still relatively conservative in requiring a minimum of 18 months for a master degree. But, in general, universities are given more autonomy and freedom in determining academic affairs.

With the speedy development of various new technologies, in particular in the areas of digital technology and big data, teaching in universities has become more challenging. The UM has made many efforts in promoting various delivery models based on new technologies, but different responses have been seen in different faculties, professors and students. Certain faculties and professors may easily adopt the new technologies, and some are less comfortable. Take my profession as an example, legal professionals in Macau, including universities, are usually slow in accepting new teaching models. I mention legal professional in general, because practicing lawyers and even the judiciary in Macau are used to make some value judgment on the quality of legal education in Macau. This particular culture has affected the change of delivery models in legal education in Macau. Similar situation also takes place in other disciplines. For example, our colleagues in the Faculty of Science and Technology insist on a three-year master program in the belief that this is essential, at the same time the industries in Macau complained that they do not have enough skilled technicians to meet their expectation. However, many young engineers do not wish to study in some of our master programs, because they do not believe that the programs may help them to develop their careers. Many reasons may have resulted in such disharmony between our education and needs of the society. Lack of an enthusiasm to learn something new on the side of our educators or simply a refusal to face the challenges raised by changing societies may be one of them. I expect that with the passing of the new Law in Macau, our master programs will have to go through substantive changes to make them to be more practical and oriented towards the needs of changing societies, local and overseas.

With the development of new technologies, university administration has become more effective. We use paper less and less. Our record keeping has become easier than before. Luckily, the present Rector and Vice Rector for Academic Affairs in the UM are all computer

experts. They have solved many practical difficulties in UM computer systems and make our systems to be more user-friendly, in particular when many offices have to generate different statistics for different purposes. Such practice is more or less in line with the present development of big data in China, where E-based technology has made life much easier for common people.

In line with the development of new technologies, the UM is considering to promote more and more across disciplinary studies and researches. A new unit name the Centre for Innovation, which purports to promote cross disciplinary cooperation, such as big data, commerce and law, and etc has been established in the UM. How much such new model of cooperation may affect our postgraduate programs is yet to be seen. I expect certain new programs involving more than one faculties may be designed and offered in the UM. At the same time, I also expect resistance and criticism from some of my colleagues who do not believe that cross disciplinary cooperation may work. They may even argue that such programs may not have proper academic classifications.

When facing challenges in societies, how much a university can do is determined not only by the top management of the university, it is also subject to the policy position of the governing body of a university, such as the university council. Many new programs require additional resources and the council due to various reasons may not place the same priority on the program suggested by a faculty or even the top management. In a sense, a council which fully appreciates the role and function of a university in meeting the present and future needs of a given society is crucial for the university to modernize all its aspects to fulfill the role of training talents and society leaders for the future.

I am glad to have this opportunity to share some thoughts on postgraduate education with colleagues from other parts of the world, and hope in the future the UM and many other universities outside Macau may develop mutually beneficial cooperation to meet the local and international challenges faced by us all.

Conceptualizing the University: The University as Citizen

Sally Pratt
Vice Provost for Graduate Programs
University of Southern California (U.S.)

I'm going to address the three assigned questions more or less in reverse order, and I'll start with a brief story about the concept of the university and graduate study in particular. The story hinges on the month of October. This is when new students typically confront the reality of PhD level research. They ask: "Do you mean I really have to stay in the lab through dinner to watch this results of this experiment come in? I can't go out to dinner with my friends and watch football on TV?" Or in my department – I'm a Slavist – they ask, "Do you mean I really have to read all of *War and Peace* in Russian? by next Tuesday?" The answer, of course, is "yes." This "yes" if further explained by the chair of my department as a brief history lesson. "You know," he says, "the university evolved from the monastery. Now, we're not asking you spend all day in prayer, and we're not requiring you to take a vow of celibacy, but…" - and here he launches into a discussion of the PhD as a vocation that requires singular focus and dedication.

His allusion to the monastery actually resonates more deeply than this little story suggests. In addition to devotion to a singular focus, the concept of the monastery includes a mission based on moral perspective. It was no accident that early universities in Europe, England, and the American colonies were founded as bastions of moral perspective. They combined religious mission with the classical concept of *artes liberales*, or the liberal arts, defined as the array of subjects and skills that equipped a free man to take part in civic life. These are the "letters, arts, and sciences" that serve as the educational basis for so many institutions today. Harvard, Yale, and Princeton all evolved from smaller institutions designed to provide theologians, pastors, and religiously informed citizens who would guide civilization along a righteous path. This sense of the liberal arts with a mission explicitly linked to moral considerations of citizenship continued well into the middle of the twentieth century.

Then came the Cold War and Sputnik era. The concept of the university changed. Exploration of moral values and citizenship receded into the background as universities increasingly came to serve geopolitical power relations, and what President Dwight Eisenhower called "the military industrial complex."[1] It was during this period that American universities became the powerhouses of research we know today. There can be no doubt that the results of the federally funded research endeavor were, and are, stunning. But at the same time, universities became so dependent on federal funding that they sometimes began to suffer from tunnel vision. Federally funded projects were intended to serve the greater good of the United States as a whole, but at the notion of the university as a steward of citizenship no longer dominated academic thinking. Intellectual and scientific elitism was the name of the game. Universities were often walled off physically from the communities surrounding them, and walled off in terms of mission and purpose as well. They perceived themselves neither as citizens of their own local communities, nor as citizens of a larger, global community.

Sometime around the year 2000, things began to change again. The Cold War was no longer

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[1]   Dwight D. Eisenhower, Farewell Speech, January 17, 1961. It is worth noting that Eisenhower actually warned against domination by the military-industrial complex. http://avalon.law.yale.edu/20th_century/eisenhower001.asp (accessed August 6, 2017)

a driving force. Universities expanded their mission yet again, with more of them affiliating themselves not just with teaching hospitals, but with the delivery of medical care in a whole range of settings, and with museums, theaters, and free-standing or municipally supported research libraries. As an indication of the web of economic interdependence between universities and their settings, the *Chronicle of Higher Education* recently published an article by Davarian L. Baldwin entitled "When Universities Swallow Cities" that includes a pun on the word "cities": the final two syllables of the word "universities" are not spelled "-sities," but "-cities" – "UniverCities."[2]

In the new millennium, advances in technology centered on data and communication have come to the fore. This shift has laid bare the troubling extent of some problems we thought we had solved, or at least mitigated: health and well-being, civil rights, social justice, global warming, and geopolitical security. Think, for example, of the data about different phenomena analyzed in the *New York Times* under the heading "The Upshot." Think of the Twitter feeds around Arab Spring, or the searing images of shootings and beatings posted on various online venues.

The emphasis on technology born of universities' dependence on the military-industrial complex has, in fact, led us away from the old intellectual and scientific elitism to an expanded sense of the *artes liberales*, to a new, more comprehensive definition of the moral obligations of the university. Most universities now recognize themselves as citizens of their communities, recognize an obligation to serve a diverse population of students, to develop a more diverse master's and PhD-level workforce both inside and outside of academia, and to engage the communities in which they are located. Sometimes this is altruism, and sometimes it is partly window dressing, a new vocabulary for public relations. But it is also driven by hard, economic reality – by the requirements of federal grants for inclusiveness, and by the demands of cities like New Haven and Los Angeles, which demand significant contributions or services in exchange for flexible municipal zoning, tax revenue lost because of the university's tax status, or other exigencies. And finally, it is driven by an increasing understanding that, in these fractious and sometimes threatening times, one of the chief functions of the university is to examine reality in the context of moral and ethical perspectives. This is not the rigid dogma of the monastery, but moral values broadly conceived. How do we decide what questions to pursue? What constitutes evidence? What constitutes freedom of speech? How do we identify our stakeholders? How do we set priorities in relation to these stakeholders?

This development in the concept and mission of the university cannot help but have consequences for the delivery of graduate education and the trajectories of faculty, students, and administrators. For now, wet labs remain wet labs, and physical proximity remains the basis of much collaborative science. Likewise, the PhD level seminar designed for intense interaction and collaborative investigations of texts and principles remains largely dependent on physical proximity.

And yet… And yet I need to tell you about the online Master's of Social Work at USC. Our dean of social work decided that she wanted to be able to serve students in rural areas, and, in the context of the university's Yellow Ribbon Program for Veterans, to increase the number of veterans trained in military social work. But how do you do this? Recognizing the importance of belonging to a cohort and the importance of group interaction, classes for the online

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2 Davarian L. Baldwin, "When Universities Swallow Cities," *The Chronicle of Higher Education Review*, July 30, 2017. http://www.chronicle.com/article/When-Universities-Swallow/240739 (accessed August 7, 2017)

MSW feature a screen on which every member of the class sees every other member of the class, live, in a little oval. This is beyond FaceBook friends messaging each other – it is multiple "live streams" so that students can see and talk with each other directly. This project has not been without its risks. We had a visiting committee assessing the Social Work PhD program a couple of years ago that spent the whole visit worrying that the online master's program was going to blow up and discredit the whole field of social work. The online MSW has been 100% trouble free. But we have addressed the problems that have come up, the field of social work is still intact, and it has become more inclusive through this online effort.

So, what can we do as administrators to enhance the trajectories of our students and, for that matter, our faculty colleagues? We must use and enhance technology, without a doubt. But we cannot expect technology to solve problems by itself. It is through the nexus of humanities, social sciences, and sciences typical of the university that we can best explore the implications of local, national, and global citizenship.[3] This is not to say that every individual scholarly project can or should be interdisciplinary. Overly zealous attempts at interdisciplinarity lead to scholarship that is only mediocre in the disciplines it claims bridge. We must train our students to master their own disciplines – and we must train our students and ourselves to work in the context the broader questions that reflect the university's role as a citizen within the local, national, and global academic communities.

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3 See, for example, Gary Saul Morson and Morton O. Schapiro, *Cents and Sensibility: What Economics Can Learn from the Humanities* (Princeton, NJ: Princeton UP, 2017).

Changing Missions and New Approaches in the Context of Global Changes

Lesley Wilson
Secretary General
European University Association

Rethinking the education mission: Europe is embarking on a major rethink of the role of learning and teaching in its universities, driven by digitalisation, a continued focus on internationalisation and increased, and changing societal and economic demands. Student numbers are growing, and the student body is more diverse which impacts at undergraduate, graduate, and doctoral level. Universities are increasingly expected to educate students to become experts, societal leaders, and informed and concerned citizens. This requires offering highly specialised expertise, and different skills sets than in the past, and from universities greater inter- and transdisciplinary approaches, and communication with a multitude of stakeholders. The link between teaching and research is widely debated, as is the question of whether a greater focus is needed on how research contributes to learning, and can be influenced by teaching, and there is greater awareness of the role of students as researchers. Changing public perceptions of the value of higher education play a role. After many years when research performance served as the main criterion to assess institutional performance several countries are now assessing teaching performance and promoting initiatives for teaching excellence.

Greater focus on the societal role of universities: The pressure on universities to demonstrate their added value to society is growing. The importance of impact and that of involving societal actors is now central to strategic plans. Efforts are made to identify more meaningful and robust approaches to impact, that recognise multiple pathways as different types of research generate different types of impact. This in turn requires new evaluative systems, with the capacity to assess quality and relevance in non-linear environments, that are process oriented and able to review the different contribution of all partners. Knowledge production is not a linear process with basic research leading to application but instead progresses in increasingly open and collaborative ways, is often the outcome of an iterative process of interaction between scientific and other societal actors.

T**he importance of 'openness':** More broadly methods and modes of knowledge production have been changing, with rapid developments in open science, global research competition and collaboration, and innovation. The progress of open access and open publishing is having a major impact, requiring new skills and competences at institutional and national level, e.g. to deal with legal matters such as copyright and data protection, the management of platforms, publishing in repositories, the sharing of research data etc. EUA surveys show that only 30% of researchers are presently aware of what open access publishing means. Hence this year's EUA Council for Doctoral Education Annual Conference focused on these issues, from open access to research funding, from research integrity to skills needs in a digital age. More specialised questions such as the importance of the digital humanities were also addressed. The importance of developing PhD holders as autonomous intellectual risk takers was a recurrent theme, as was the need to develop mindsets targeting not only research careers but also innovation and entrepreneurship, and other related careers issues.

The impact of the 'knowledge society': UNESCO's 2015 Science Report shows that despite the financial and economic crisis, expenditure on R&D rose by 30.5 % between 2007 and 2013. The number of researchers increased by 21%, there was a significant growth in the number of number of scientific publications and there are now more female researchers in Latin America (44%) and the Arab Region (37%) than in the EU (33%) The report confirms that science is becoming more mobile and that there is greater collaboration and interdependence among systems. International student numbers rose by 46% between 2005-2013, from 2.8 Mio to 4.1 Mio, with countries striving to attract and retain talent. The US, the UK and France host the largest contingent of PhD students although more and more countries are supporting the international mobility of graduates, as a means of acquiring skills and experience, e.g. in Europe the introduction of the 'scientific visa'. There are major differences across Europe in the % of graduate students going on to PhD level. Numbers fluctuate from less than 5% to over 30%. Austria and Germany have the highest percentages, 20 to 29% while the smallest cohorts are in Spain and Kazakhstan. The OECD reports that one in 10 master level students is an international student. The innovative capacity of master programmes makes them versatile and often a barometer of future trends; they address specific European needs while attracting students world-wide.

Internationalisation and the importance of doctoral education: The outcomes of collaborative projects undertaken by EUA in 2013-2014, with partners from Europe, Africa, Asia and Latin America, suggest that there is consensus on the importance of doctoral education and the training of future researchers as being essential for building and sustaining capacity, and as a basis for deepening partnerships. The project outcomes suggest that the language of the knowledge society is becoming global, for example in supporting the conception of doctoral education as a driving force for social and economic development and as a means of investing in high level skills. Our findings also underline the importance of doctoral education for the level of internationalisation of a given institution and indeed that doctoral education plays a growing role in the development of institutional internationalisation strategies. Thus, internationalisation remains a major driver for institutions even if there are questions being raised about how to reconcile global prestige with the need for strong local commitment. In future, it would seem important to ensure that the link to the UN sustainable development goals is made in collaborative projects with global partners.

Alternative pathways to the PhD: in the last decade in Germany the figures show a steady rise in the number of doctorates being awarded at Universities of Applied Sciences, through 'cooperative doctoral training'. This entails Professors from Universities of Applied Science acting as supervisors, reviewers and examiners, together with PhD awarding universities, often in the same geographical location. It is also worth noting that the European League of the Institutes of the Arts has published a position paper this year entitled the 'Florence Principles', on the doctorate in the Arts, which is the first Europe wide initiative in this field.

The changing role of students, faculty and administrators: The traditional roles of both students and teachers are changing, with more active learning, greater involvement of students in research, and in research based learning, with teachers providing a more supportive role. While the likelihood is high that digital learning will play a much bigger role than today, it is difficult to predict future formats, and the pedagogical, cultural and organisational consequences. This depends on technology developments and future "business models", albeit with universities in continental Europe only partially, if at all market driven;

it also depends on 'take-up' within the sector. What will the "flipped classroom" look like and what will it mean for the future role of faculty? Digitalisation will also have an impact on university infrastructure and it is to be expected that new administrator positions will be developed and replace others no longer relevant. We are presently in a phase of experimentation and gradual change. It will be important to monitor developments and look for new and innovative approaches to learning. There are open questions linked to lack of acceptance by staff and/or students, adverse regulation and lack of resources, or simply not enough certainty that changes will improve quality. For example, digital learning initiatives are sometimes very focussed on technical aspects, and neglect pedagogical issues. At system level, digital learning is often used synonymously for learning innovation, while it may just bring technical change. Specific initiatives rarely transcend the boundaries of individual institutions, and are often limited to specific faculties or departments, or even individual staff. Where they exist at system level, initiatives rarely travel across borders, or contribute to broader European debate. Hence, unlike the structural changes of the previous decades, this has not yet resulted into a coherent European agenda.

The Current Situation of Graduate Education in Japan

Shinichi Yamamoto
Dean of Graduate Studies
J.F. Oberlin University (Japan)

Higher Education in Japan is now facing to a great but difficult change due to the recent and rapid socio-economic challenges including globalization, knowledge-based society, and aging society with decline of younger population. Most of us believe that higher education in Japan should change to adapt to such new environment that requires universities to be reformed by themselves. Graduate education is no exception and it has been expected to play greater roles in the future of Japan. This is because graduate education contributes enormously to society in terms of economic growth and social welfare by training highly talented people and also by performing advanced research that is concerned with social and industrial needs. To date, however, reform on graduate education is still on the way to the goal by various reasons. We should share good understanding of graduate education and look for the solution

In Japan, around 3 million students are studying at universities and colleges now. However, the huge enrollment is occupied mostly by young students at the ages of 18-22. A recent survey by OECD, only 2 % of freshmen of universities and colleges are over 25 years old in Japan, while 20 % is the average among other OECD member countries. Adult students is very few in Japan. This is a surprise for international students studying in Japan. An international student from Europe whom we accept for summer course some years ago said to me that Japanese students look very young, like kids, because, I guess, she was over 30 and it was quite usual in her home country.

Why does this big gap exist? It is due to the existence of unique job-seeking system. In Japan, leading companies (Dai-Kigyo in Japanese) have kept so-called "Japanese way of employment," in which they employ new graduates under the age of 25 or so only once a year as the tenure-track employees. Thus students start job-seeking even they are still juniors so that they can be employed immediately after graduation. Students in Japan, who study humanities and social sciences, do not work hard because they know academic training at universities is not so much useful for their future. Instead they tend to have more interest in getting generic skills, such as communication with others.

This causes another problem. Graduate education in Japan is small in scale compared with huge undergraduate enrolment. It is because, unless they plan to work for academia, graduate study may cause difficulty for them to find good job. They are too old (over 25) and too much narrowly trained. In this sense, value of graduate degrees in Japan, including Ph.D. is not highly regarded especially in business and in bureaucracy in the government. The chart below shows great difference of granted degrees between Japan and the U.S.A. While undergraduate degree granting in Japan is about 1/3 of the U.S., graduate degree granting is far less in number, only 1/10 of the U.S. In social sciences and education, the difference is greater. This shows that the graduate degrees are less valuable in those fields in Japan.

With the advancement to knowledge-based economy and globalization, however, the Japanese way of employment and the meaning of study at universities are challenged greatly. Japanese government has implemented university reform policies, including national accredi-

tation system, to improve quality of university education so that students can adapt to the changes. Value of degree and diploma should be much more regarded.

Recently, the Japanese government, by placing a special emphasis on innovation for economic growth, expressed an important policy of reforming Japanese undergraduate and graduate education to attain the highest level of graduate education in the world and to respond to the various needs in society.

I have worked for 3 universities in recent 25years as a researcher on higher education system and also I had worked for the Ministry of education before joining into academia in the 1970s and 80s. As a dean of graduate studies, I would like to continue my work for the promotion of graduate education and training in Japan.

The Number of Earned Degrees by Field and by Country
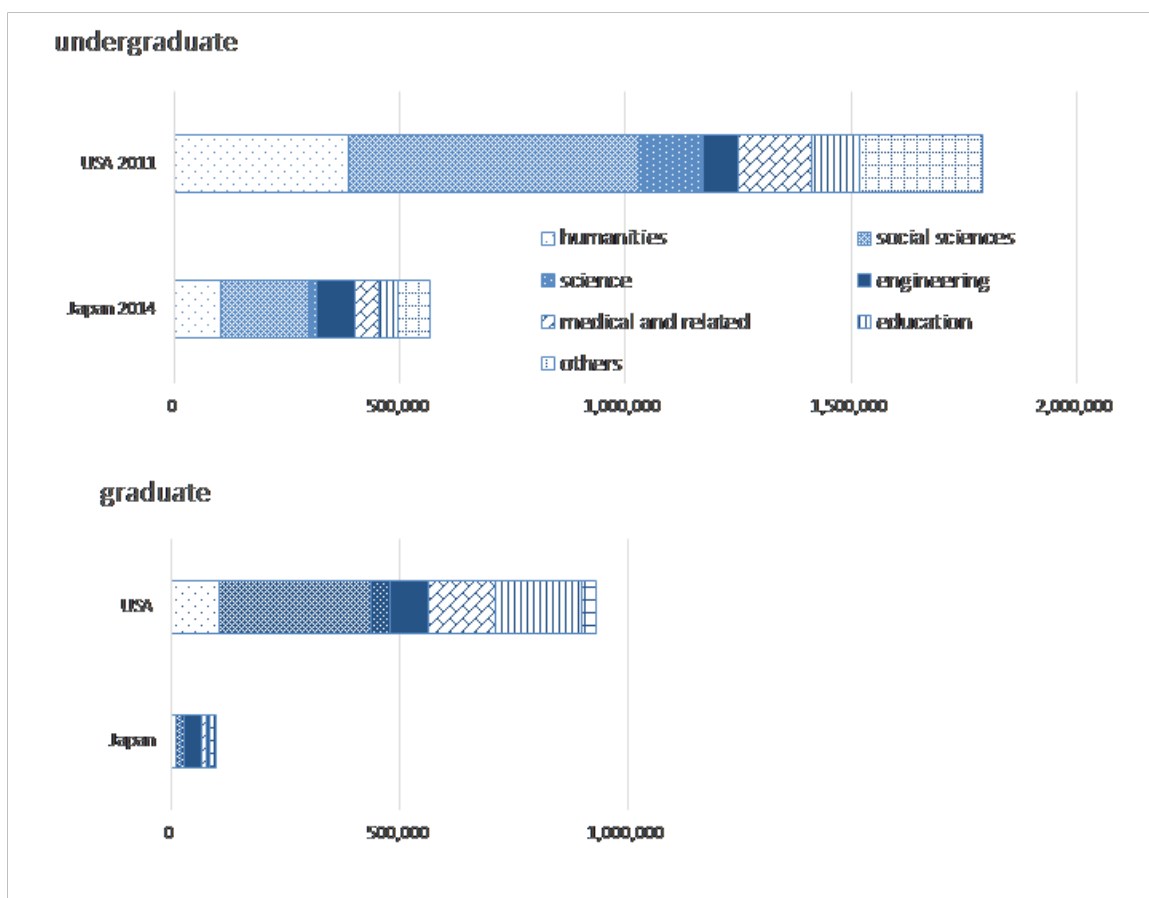
Source: USA: USDE, Digest of Education Statistics
　　　　　　Japan: Ministry of Education, School Basic Survey

Biographical Sketches of Participants

Mr. Philippe-Edwin Bélanger

From 2002 to 2012, Philippe-Edwin Bélanger worked at Fonds de recherche du Québec - Nature et technologies, overseeing the organization's scholarship programs and France-Québec partnership. He was appointed director of graduate and postdoctoral studies at Institut national de la recherche scientifique (INRS) in 2012. As director, he is responsible for academic program management, administrative support for graduate students and postdoctoral fellows, the registrar's office, and student financial aid. Trained in political science and public administration, Mr. Bélanger has conducted research on the impact of Québec's family policy. As a member of Conseil supérieur de l'éducation du Québec's commission on university education and research from 2008 to 2011, he contributed to *Pour une vision actualisée des formations aux cycles supérieurs,* an advisory opinion presented to Québec's Minister of Education, Recreation and Sports, highlighting various phenomena, concerns, and issues associated with graduate studies. A very active member of Québec and Canadian professional associations, Bélanger was president of Association des administratrices et des administrateurs de recherche universitaire du Québec (Québec Association of University Research Administrators) in 2013. During that time, he defended the importance of maintaining public investment in university research. Since July 2014, he has been president of Association des doyens des études supérieures au Québec (Québec Association of Deans of Graduate Studies). As president he conducted, in collaboration with Ministère de l'Enseignement supérieur du Québec (Ministry of Higher Education), Research Funds of Québec, and Francophone Association for the Advancement of Knowledge, the first Québec survey on Ph.D. competencies for the purposes of enhancing programs, improving the professional integration of graduates, and highlighting the contribution of doctoral students to the development of society. Since November 2015, he has been a board member of the Canadian Association for Graduate Studies (CAGS) and a member of the Canadian Association of Postdoctoral Administrators (CAPA) steering committee.

Ms. Jacqueline Briel

As Executive Director of Higher Education Programs in the Global Division at ETS, Jacqueline Briel oversees the GRE program and a variety of products and data use services that assess student learning outcomes and support student success (e.g. HEIghten™, *ETS*® Major Field Tests, SuccessNavigator®) as well as other products and services related to higher education. She works closely with the GRE Board and led the development and launch of the GRE revised General Test. She began her career at ETS in 1983 and has served in a variety of capacities including program director for operations, leading research and development projects, and the development of new assessments. Briel holds a Master's degree in Educational Psychology from Temple University and a Bachelor's degree in Psychology from Wells College. She also has earned the Project Management Professional (PMP) credential.

Dr. Brenda Brouwer

As Vice-Provost and Dean, Dr. Brouwer promotes and supports the graduate mission of the university, providing both academic and administrative leadership. She represents the interests and needs of graduate programs and graduate students and collaborates with faculty deans, and graduate coordinators to develop and support excellence in all aspects of graduate education including academic training and professional development. The expansion of graduate credentials, enrolment management, maintenance of high academic standards, and the establishment of policies and best practices that support graduate students academically and financially are part of her portfolio. Dr. Brouwer is serving her second year as the President of the Canadian

Association of Graduate Studies. Dr. Brouwer joined Queen's in 1990 after completing her PhD in Neuroscience at the University of Toronto. She holds a BSc. in Kinesiology (University of Waterloo) and an MSc in Biomechanics (McGill University). She served as an Associate Dean in the School of Graduate Studies from 2005 to 2010 before moving into the role of Vice-Provost and Dean. She maintains her research lab which focuses primarily on quantifying the biomechanical, neuromuscular and metabolic demands of mobility in healthy aging and stroke. She has supervised over 34 research master's and doctoral students and post-doctoral fellows in the area of disordered movement control and physical function.

Dr. Jani Brouwer

Jani Brouwer is Director of the Doctoral College at the Vice-Presidency for Research of the Pontificia Universidad Católica de Chile (PUC). She obtained her PhD in Sciences of Education at the University of Amsterdam in the Netherlands. As Director of the Doctoral College she is responsible for the management and coordination of activities related to doctoral studies at PUC. This includes ensuring the quality of its 34 doctoral programs and promoting UC policies and methods to enable curricular flexibility, interdisciplinarity and international¬ization of doctoral training. Before taking on her position at PUC, Jani worked for UNICEF, Fundación Andes and then at CONICYT, Chile's National Commission for Scientific and Technological Research, in charge of the coordination of the Basal Financing Programme for Centres of Excellence and the direction of the Graduate Scholarship Programme in 2010. She lives and works in Chile since 1991. She also worked in Bogotá, Colombia as a lecturer in Sociology and Education Methodology at the Jorge Tadeo Lozano University.

Professor Pat Buckley

Professor Pat Buckley became Dean of Graduate Studies at the University of South Australia in late 2014. Previously, she was the Director of the Sansom Institute for Health Research and the Dean Research and Research Education in the Division of Health Sciences. A biochemist-turned-physiologist, Pat has initiated and led many improvements in research training here and elsewhere. At UniSA, she also leads researcher development across the university, and works closely with staff to enhance and support their research capacity. As Dean, she is responsible for developing an excellent and supportive environment for students completing higher degrees by research, and she works closely with the Deputy Vice-Chancellor: Research & Innovation in aligning the University's research training programs with its strategy of research and innovation with strong industry focus.

Dr. Hans-Joachim Bungartz

Hans-Joachim Bungartz is a full professor of informatics and mathematics at TUM and holds the *Scientific Computing* chair in the Informatics Department. Dr. Bungartz earned degrees in mathematics and informatics and a PhD as well as his habilitation in informatics, all from TUM. He became associate professor of mathematics at University of Augsburg, full professor of informatics at University of Stuttgart, and returned to TUM in 2005. Since 2008, he has been affiliated with the Department of Mechanical Engineering at University of Belgrade, Serbia. Since 2013, Dr. Bungartz has served as both Dean of Informatics and TUM Graduate Dean, heading TUM Graduate School with responsibility of doctoral education TUM-wide. He is a member of TUM's Extended Board of Management. Dr. Bungartz has served or serves on several editorial boards, and he was a member of the scientific directorate of *Leibniz Insti-*

tute for Informatics Schloss Dagstuhl. He is involved in various national and international review and advisory board activities. In 2011, he was elected chairman of the *German National Research and Educational Network* (DFN). Furthermore, Dr. Bungartz is a board member of *Leibniz Supercomputing Center*. In 2016, Dr. Bungartz has been appointed a steering committee member of the Council for Doctoral Education of the European University Association. His research interests are where computational engineering, scientific computing, and supercomputing meet. He works on parallel numerical algorithms, hardware-aware numerics, high-dimensional problems, data analytics, and aspects of HPC software, with fields of application such as computational fluid dynamics. Most of his projects have been interdisciplinary ones. As an example, he coordinates DFG's Priority Program *Software for Exascale Computing*.

Dr. Karen Butler-Purry

Dr. Karen Butler-Purry is interim vice president for research at Texas A&M University, having served as associate provost for graduate and professional studies from 2010-2017. Butler-Purry is also a professor in the department of electrical and computer engineering, having served at all faculty levels beginning with her initial appointment as visiting assistant professor of electrical engineering in 1994. Butler-Purry possesses comprehensive experience in graduate education as a faculty member, administrator, researcher and program leader. From 2001-2004, she served as Assistant Dean for Graduate Programs in the College of Engineering, and served as Associate Department Head in the Electrical and Computer Engineering Department from 2008-2010. Further, Butler-Purry has directed several fellowship and education projects promoting recruitment and retention at the undergraduate and graduate level, particularly for historically underrepresented minority students. Dr. Butler-Purry developed a successful research program, securing funding from federal agencies such as NSF and ONR and also industry sources such as electric utility companies. She has supervised and funded over 40 graduate and 65 undergraduate research students. During her inaugural year as associate provost at Texas A&M, Butler-Purry responded to public higher education funding reductions and led a campus review of distribution policies for university graduate student support funds. Her efforts created a plan that prioritized providing necessary financial support to attract the brightest doctoral students while concurrently allowing individual colleges to align the funds received with their specific strategic priorities. Also under Butler-Purry's leadership, the TAMU Office of Graduate and Professional Studies (OGAPS) built a new university initiative to promote and support graduate student participation in professional development opportunities.

Professor Mee-Len Chye

Mee-Len Chye, the Wilson and Amelia Wong Professor in Plant Biotechnology, is the Dean of the Graduate School at the University of Hong Kong (HKU). She completed her B.Sc. at the University of Malaya and her Ph.D. on a Commonwealth Scholarship at the University of Melbourne. Following her postdoctoral training in Plant Molecular Biology at the Rock¬efeller University (New York) and the Institute of Molecular and Cell Biology (Singapore), she joined the University of Hong Kong in 1993 and was promoted to Professor in 2005. She has been awarded an Edward Clarence Dyason Universitas 21 Fellowship (2004/05), a HKU Outstanding University Researcher Award (2006/07), a Croucher Senior Research Fellowship (2007/08), and an Eileen Mary Harris Scholarship (2013). She serves on the editorial boards of Plant Molecular Biology (Springer), Planta (Springer), Frontiers in Plant Metabolism & Chemodiversity and Frontiers in Plant Physiology. Members of her laboratory at the School of Biological Sciences, HKU, work on acyl-CoA-binding proteins in plant lipid metabolism

using Arabidopsis as a model plant, and investigate the use of these proteins in conferring stress tolerance in transgenic plants. Find¬ings from her research will be applicable for crop improvement in agriculture.

Professor Denise Cuthbert

Professor Denise Cuthbert is the Associate Deputy Vice-Chancellor Research Training and Development of the School of Graduate Research at RMIT University and Convenor of the Australian Council of Graduate Research ("ACGR"). Denise's work in the field of graduate research education and her supervision of higher degree by research candidates have been recognised with several awards. In 2006, she was awarded the Faculty of Arts Excellence in Research Supervision Award at Monash University. This was followed in 2007 with her re-ceipt of both the Vice-Chancellor's Prize for Postgraduate Supervision and a Carrick Citation for Outstanding Contribution to Student Learning for 'exemplary practice in graduate super-vision' and 'outstanding academic leadership in graduate research education in the humani-ties, arts and social sciences.' She has initiated a range of highly successful programs for the support of postgraduate research supervisors and their supervisors. Denise is an accomplished supervisor, with over 40 candidates successfully graduating under her supervision of which the majority are PhDs and high publication rates among her candidates. Denise is also keenly committed to the development of research cultures in disciplines and fields which are 'new to research' and to the processes of cultural and institutional change involved in establishing research cultures in former teaching only or teaching intensive institutions. She has had experi-ence of research development work in settings such as South Africa, Malaysia, Vietnam and the Philippines.

Professor Barbara Dooley

Associate Professor Barbara Dooley is Dean of Graduate Studies and Deputy Registrar and provides support to the Registrar and Deputy President on enhancing the student experience and ensuring the delivery of the university strategy in education. As Dean of Graduate Studies, Dooley works with her team to ensure that UCD's structured PhD's are aligned with the Na-tional Framework for Doctoral Education so that robust quality assurance is integral to UCD's doctoral education. She also oversees UCD's Research Supervisor Support & Development Programme, which is aligned with best international practice and designed for faculty to en-hance the quality of their supervision of PhD students. Prior to her appointment, Dooley was Vice-Principal for Teaching and Learning at the College of Social Science and Law from 2009 to 2014 and Head of the School Psychology from 2005 to 2009. She has teaching experience at all levels from undergraduate through to PhD supervision and is the Director of the UCD Ad Astra Academy, which nurtures exceptional students by offering them unique supports and opportunities to further develop their talents. Dooley holds a PhD in Psychology from UCD. Her field of research is on the application of psychological theory and methodology to a range of priority mental health areas: risk and protective factors in youth mental health, body-image research and eating disorders.

Professor Luke Georghiou

Luke is Vice-President for Research and Innovation at the University of Manchester and Professor of Science and Technology Policy and Management in the Manchester Institute of Innovation Research at the Alliance Manchester Business School. Since 2010 he has been

responsible for the University's research strategy and its implementation, doctoral training, and for business engagement and commercialisation activities as well as general executive duties. He continues to be active in research and policy advice to governments and business with current work on innovation management, public procurement and innovation and evaluation of the national demonstrator project for Internet of Things (CityVerve). In 2011, he was elected to the Academia Europaea. He is a member of RISE, the European Commissioner for Research and Innovation's high-level policy advisory group. He has chaired several international panels, including acting as rapporteur for the influential report to European leaders, Creating an Innovative Europe which put demand-side innovation policy onto the political agenda, and as Chairman of the High-level Expert Group on Rationales for the European Research Area which recommended a refocusing of European research and innovation support on a series of grand challenges. He was Co-Champion of the 2016 Euroscience Open Forum (ESOF), Europe's largest pan-disciplinary science conference. He is currently a member of the Board of Directors of Manchester Science Partnerships, the UK's largest science park company. Since 2016 he has chaired the Steering Committee of the European Universities Association Council for Doctoral Education. He is on the editorial board of eight journals and has published extensively in leading outlets including Science and Nature. He has supervised 40 doctoral candidates to successful completion.

Ms. Katherine C. Hazelrigg

Katherine Hazelrigg joined the Council of Graduate Schools in 2015 as the communications manager. In August of 2017, she was promoted to assistant director of communications. Her responsibilities at the Council include website content management and development; print and electronic communications; social media; the CGS Global Summit; and media and public relations. Prior to joining CGS, Hazelrigg was a communications coordinator and program assistant at the Association of Public and Land-grant Universities (APLU), where she managed communications, event planning, projects, and grants in the Office of Research, Innovation, and STEM Policy. Katherine spent several years teaching English 101 and Introduction to Literature courses at the University of Maryland, College Park, while earning an M.A. in English. She received her B.A. in English with a minor in French from The Pennsylvania State University's Schreyer Honors College and served on the board of directors for the award-winning student newspaper, *The Daily Collegian*. She spends her free time raising awareness for pediatric cancer as a member of the advisory board for Kate's Cause and the CureFest USA planning committee.

Ms. Ali Huberlie

Ali is a Senior Consultant in the Education Practice of Parthenon-EY, a strategy consultancy. She advises clients in both the K-12 and post-secondary sectors on issues related to strategy development, operational improvement, and performance management. Her clients include service providers to the education market, large school districts, school networks, universities, and large foundations. Much of her work is focused on in-depth data analysis and deep stakeholder engagement to ultimately drive successful strategic planning for the client. Ali's background in education includes experience at Education Resource Strategies (where she authored case studies on effective district turnarounds), as well as co-founding and running a nonprofit organization that works with over fifty different Philadelphia public schools. Ali received her B.A. magna cum laude in Urban Studies and Political Science from the University of Pennsylvania and her M.B.A. (high distinction) from Harvard Business School.

Professor Lucy Johnston

Professor Johnston is Dean of Graduate Research at the University of Newcastle driving growth and improvements in graduate research training. She started at Newcastle in 2016 after 22 years at the University of Canterbury, New Zealand, the final 5 as Dean of Postgraduate Research. Professor Johnston completed her BA (Hons) in Experimental Psychology at the University of Oxford and PhD in Social Psychology at the University Bristol and is also a qualified sport psychologist. She is a recognised experimental social psychologist, whose research focuses on the behaviour of individuals in social interactions, with an emphasis on non-verbal behaviour. Professor Johnston was a member of the inaugural management team of the New Zealand Institute of Language, Brain and Behaviour, and following the Christchurch earthquake in 2011, was appointed to the Psychosocial Recovery Advisory Group for the Joint Centre for Disaster Research. In 2004, she was a Distinguished Visiting Professor at the University of Connecticut. Professor Johnston was the Chair of the New Zealand Deans and Directors of Graduate Studies (NZ DDOGS) and was involved in the development of the Australian Best Practice Guidelines for Higher Degree Research. She was also the Convenor of the Universities New Zealand Scholarship Committee from 2011 to 2016. Lucy was awarded Oxford Blues and full colours at the University of Bristol for basketball and played for the British Universities. She rowed for her Oxford College and City of Bristol and played soccer for the University of Bristol. She recently retired from 10 seasons completing in road cycling and triathlons.

Professor Joe Luca

Professor Joe Luca is the Dean of the Graduate Research School at Edith Cowan University. His research interests are focused on promoting the quality of research training, supervisory practice, online learning, graduate attributes and project management. In these fields, he has written over 100 refereed journal articles, book chapters, book and conference publications. He has been recognised for his excellence in teaching and learning and awarded a national award for Teaching Excellence (Australian Awards for University Teaching), and an Australian Citation Award. He has also been awarded two Australian Government grants to help improve the quality of research training in Australia.

Dr. Nancy Marcus

Dr. Nancy Marcus, Robert O. Lawton Distinguished Professor of Oceanography has been Dean of the Graduate School at Florida State University since August 2005. Her responsibilities include oversight of the education of approximately 8,000 graduate and professional students. As Dean, she has championed interdisciplinary engagement and professional development programs for graduate students. She earned a B.A. in Biology from Goucher College and a Ph.D. in Biology from Yale University. After spending 11 years as a staff scientist at the Woods Hole Oceanographic Institution, she joined the Department of Oceanography at Florida State University in 1987. She served as Director of the FSU Marine Laboratory from 1989-2001, Chairperson of the Department of Oceanography from 2003-2005, and Director of the Women in Math, Science, and Engineering program from 2001-2005. Dr. Marcus is a Fellow of the American Association for the Advancement of Science and a Fellow of the Association for Women in Science. She was President of the American Society of Limnology and Oceanography in 1995, a Regional Editor of Marine Biology from 1992-2000, and a member of the Editorial Advisory Board, Marine Ecology Progress Series from 1992–1996. She has

served as a member of the Ocean Studies Board of the National Research Council, Chair of the NASULGC Board on Oceans and Atmosphere, and President of the Conference of Southern Graduate Schools. She is currently Chair of the Council of Graduate Schools' Board of Directors.

Professor Liviu Matei

Liviu Matei is Provost and Pro-Rector of Central European University and a Professor of Higher Education Policy at the School of Public Policy. He taught at universities in Romania, Hungary and the U.S., consulted extensively in the area of higher education policy and conducted applied policy research project for the World Bank, UNESCO, OSCE, the Council of Europe, the European Commission, and other international organizations (intergovernmental and non-governmental), national authorities and universities from Europe and Asia. Matei is a member of the Board of Trustees of the American University of Central Asia and serves on the editorial board of the Journal of the European Higher Education Area. He studied philosophy and psychology at Babei-Bolyai University Cluj, and Sociology at Bucharest University, Romania, and received his PhD from the latter. He benefited from fellowships at the Institut Supérieur de Formation Sociale et de Communication, Bruxelles, The New School for Social Research, Université Paris X Nanterre, Université de Savoie, and the Salzburg Seminar.

Professor John Shijian Mo

Professor John Shijian Mo worked in Deakin University, Australia; City University of Hong Kong; and China University of Political Science and Law. Between 2005 and 2011, Professor Mo was the Dean of Faculty of International Law, China University of Political Science and Law. Between Dec 2011 and July 2016, Prof Mo was the Dean of Faculty of Law, University of Macau. Since July 2016, Prof Mo has been the Dean of Graduate School, University of Macau. Professor Mo was a Member of the Governing Council of UNIDROIT (2009-2013); presently Titular Member of International Academy of Comparative Law (The Hague); Vice President of China Society for International Economic Law; Vice President of China Association for International Economic and Trade Law Studies; Arbitrator of China International Economic and Trade Commission; Arbitrator of China Maritime Arbitration Commission; arbitrators of a number of local arbitration commissions in China; Research Fellow of the "One Belt and One Road" Judicial Research Centre of the National Supreme Court of China (2015-2018); Advisor for Foreign Related Commercial and Maritime Trials, appointed by the National Supreme Court of China (2015-2018); Member of the Academic Committee of the National Research Centre for Air Traffic Management Law and Standard; Chairman of Macau Association on the Study of Law on Big Data; Barrister at the Supreme Court of Queensland, Australia; and Barrister and Solicitor at the Supreme Court of Victoria, Australia. Professor Mo has authored and edited 20 books and one of his books, *International Commercial Law*, the 6th edition was published in 2015 by LexisNexis Butterworths. He has also published more than 160 articles in both English and Chinese language. His major interests include international economic law, public international law, private international law, shipping law, arbitration law, commercial law, law on big data and Chinese law.

Professor Jongryn Mo

Jongryn Mo is Dean for International Affairs at Graduate School of International Studies, Yonsei University and director of the Hills Governance Center at Yonsei University. He also maintains non-residence affiliations with the Hoover Institution, Stanford University, and the Asan

Institute for Policy Studies, Seoul, Korea. During 2004-2008, he served as the founding dean of Underwood International College at Yonsei University. Prior to joining Yonsei in 1996, he was an assistant professor of government at the University of Texas at Austin. Jongryn Mo has published many academic books and articles and his op-eds and articles have appeared in leading newspapers and magazines such as Wall Street Journal, the Strait Times, Asia Policy and Policy Review. He wrote, with Barry Weingast, Korean Political and Economic Development: Crisis, Security and Institutional Rebalancing (2013) and edited Middle Powers and G20 Governance (2013). His areas of research interests are international political economy, East Asian development, and political economics and bargaining. Jongryn Mo holds a B.A. in Economics from Cornell University and a M.S. in social science from the California Institute of Technology, and a Ph.D. in Business (Political Economics) from Stanford University.

Professor Shireen Motala

Shireen Motala is the Senior Director of the Postgraduate School within the Research and Innovation Division, University of Johannesburg. She is part of the Executive Leadership Group at the UJ. Prior to joining UJ in 2010, Professor Motala, was the Director of the Education Policy Unit at the University of the Witwatersrand. Her academic qualifications include: a BA (University of Durban-Westville), a B Social Science Honours (University of Cape Town), an MA (University of Warwick), a PGCE (University of London) and a PhD (University of the Witwatersrand) She is currently UJ's representative on the international body, the Council Graduate Schools and participates in the Universitas 21 activities. She has held numerous leadership roles related to Higher Education including: Chairperson of the Education Policy Consortium (2006-2010), Chairperson of the UNESCO South African Commission (2001-2006), and first inaugural president of the South African Research Association (SAERA) (2013-2014).She continues to be an executive member of SAERA. In 2010 she was appointed by the Minster of Higher Education and Training to serve on the Council of Higher Education (CHE) and re-appointed in 2015 to the Council and to the Executive Committee of the CHE. In 2013, she served on the Ministerial Committee to review the national Senior Certificate examination, focussing specifically on promotion requirements. She is currently a trustee on the Boards of the Centre for Education Development, and the South African Institute for Distance Education. An NRF (National Research Foundation) rated researcher, she has initiated collaborations between universities across Africa and with Asia and Europe, and this has led to the formation of long-term regional and international partnerships. Her research record is substantial and includes publications in journals and books and editorship of local and international journals. Her research interests and expertise have been in the areas of education financing and school reform, access and equity, education quality and the internationalisation of higher education.

Dr. Suzanne Ortega

Suzanne Ortega became the sixth President of the Council of Graduate Schools on July 1, 2014. Prior to assuming her current position, she served as the University of North Carolina Senior Vice President for Academic Affairs (2011-14). Previous appointments included the Executive Vice President and Provost at the University of New Mexico, Vice Provost and Graduate Dean at the University of Washington, and the University of Missouri. Dr. Ortega's masters and doctoral degrees in sociology were completed at Vanderbilt University. With primary research interests in mental health epidemiology, health services, and race and ethnic relations, Dr. Ortega is the author or co-author of numerous journal articles, book chapters, and an introductory sociology text, now in its 8th edition. An award winning teacher, Dr. Ortega has also served on a number of review panels for NSF and NIH and has been the principal

investigator or co-investigator on grants totaling more than $6 million in state and federal funds. Dr. Ortega serves or has served on a number of professional association boards, committees, including, the Executive Boards of the Council of Graduate Schools, the Graduate Record Exam (GRE), the National Academies of Science Committee on the Assessment of the Research Doctorate, the National Science Foundation's Human Resources Expert Panel, the North Carolina E-learning Commission, the North Carolina Public School Forum, the UNC TV Foundation, and the UNC Press Board of Governors.

Dr. Susan Porter

Susan Porter is Dean and Vice-Provost, Graduate and Postdoctoral Studies at the University of British Columbia (UBC). UBC is a public university with approximately 10,000 graduate students, 900 postdoctoral fellows, and 40,000 undergraduates. A strong focus of Dr. Porter's throughout her 16 years in various graduate administrative positions has been the preparation of graduate students and postdoctoral fellows for their lives as scholars after their studies. She led the revision and expansion of comprehensive programs of student and postdoctoral development offerings with over 3000 participants annually, and has focused recent attention on the PhD degree. As part of this latter focus, she has led a conversation and various initiatives at UBC to 'reimagine the PhD', and in particular to support students in integrating a breadth of career-relevant scholarship into their program and dissertations. She is also the Vice-President of the Canadian Association for Graduate Studies, and is co-leading a national task force on the future of the doctoral dissertation. She is a Clinical Professor in the Department of Pathology and Laboratory Medicine, with a background in both basic and clinical molecular genetics.

Dr. Sally (Sarah) Pratt

Sally (Sarah) Pratt became Vice Provost for Graduate Programs at the University of Southern California in 2010, after serving for eight years as Dean of Academic Programs in USC Dornsife College. She is responsible for PhD, master's and graduate certificate programs across the humanities, sciences, and social sciences, as well as seventeen professional schools, including engineering, business, public policy, social work, health sciences, and cinema, among others. She serves as a member of the Board of Directors of the Council of Graduate Schools and the Executive Board of the AAU Association of Graduate Schools. She is interested in a wide range issues, including increasing diversity in graduate study, academic professional development, ways of addressing sexual misconduct, and the nature and use of the PhD degree. She has served on the accreditation committee of the Western Association of Schools and Colleges. Within USC, she has increased efforts to support diversity and academic professional development, and reduced the teaching load for graduate students to allow more time for study and decrease time to degree. She has implemented a system of PhD Program Progress Data and established a Graduate School Advisory Council made up of faculty, staff, and students, and a group called Friends of the Graduate School made up of representatives from financial aid, campus security, health services, and other offices. She received her bachelor's degree from Yale and her PhD from Columbia. Her research focuses on Russian poetry. She remains active in the field of Slavic Studies.

Professor Adham Ramadan

Adham Ramadan, a Professor of Chemistry, was appointed Dean of Graduate Studies at The American University in Cairo (AUC) in January 2014. He served as Chair of the Department of Chemistry, AUC, from 2010 to 2013. As Dean of Graduate Studies, he initiated a universi-

ty-wide review of the graduate admissions system and the graduate fellowship award system, as well as worked on the enhancement of university-wide metrics for assessing the performance of graduate programs. He updated university-level coordination of graduate programs, leading to the development of a Graduate Studies Manual. He has recently been involved in the strategic development and implementation of blended and online learning for graduate programs, Strategic Enrollment Management for Graduate Studies, as well as Graduate Studies opportunities for refugees.

Mr. Seth Reynolds

Seth Reynolds is a Managing Director in the Education Practice of Parthenon-EY, a strategy consultancy. His extensive education experience spans for-profit and public sectors across K-12, post-secondary, and corporate training. He advises clients on issues related to strategy development, operational improvement, performance management, investment due diligence, and new venture creation. His clients include a wide range of organizations from start-ups to Fortune 500 companies, schools districts, charter, universities, government agencies, and some of the world's largest foundations. Prior to joining Parthenon-EY, Seth was a Teach for America corps member and worked at SchoolNet. He is a founding member of the Board of Trustees of Excel Academy, a charter middle school in East Boston, MA. Seth holds a B.A., magna cum laude, from Amherst College. He received his M.B.A. from the MIT Sloan School of Management and his Masters of Public Administration from the Harvard University Kennedy School of Government.

Dr. Christopher Sindt

Christopher Sindt has served since 2011 as vice provost for graduate and professional studies at Saint Mary's College of California. In 2011-2012, he was an American Council of Education Fellow with a placement at the University of California, Davis. Sindt also serves as Saint Mary's accreditation liaison officer to the Western Association of Schools and Colleges (WASC), and works on accreditation teams visiting other colleges and universities in the region. Saint Mary's College of California is a comprehensive university with 4500 students and approximately 1500 graduate students. As vice provost, Sindt is responsible for maintaining excellence in graduate and professional programs, developing programs and academic centers, supporting research, maintaining policies and services for graduate students, and implementing interdisciplinary activities. As founding vice provost, Sindt initiated many new policies and procedures supporting graduate education, implemented a strategic enrollment plan, improved services, and developed community programming for graduate students. Sindt earned his M.A. and Ph.D. in English from the University of California, Davis, and a B.A. in English from the University of California, Los Angeles. He has been the recipient of numerous awards and fellowships for his poetry, including the James D. Phelan award and fellowships at the Macdowell Colony and the Blue Mountain Center. He is the author of two collections of poetry, *The Bodies*, and most recently, *System and Population*.

Dr. Mark J. T. Smith

Mark J. T. Smith received the B.S. degree from MIT and the M.S. and Ph.D. degrees from the Georgia Institute of Technology, all in electrical engineering. He joined the electrical and computer engineering (ECE) faculty at Georgia Tech in 1985, where he remained for the next 18 years. While working primarily on the Atlanta campus, he spent several terms in 1991-93 on the Institute's European campus in Metz, France. Five years later he served a four-year

term as Executive Assistant to the President of Georgia Tech.   In January 2003, he joined the faculty at Purdue University as head of the ECE School.   A current member of the Board, Smith has been engaged with the national ECE Department Heads Association, where he served as secretary/treasurer, vice president and president in 2005-2008. In 2009, Smith was appointed Dean of the Purdue University Graduate School. He is a member of the Board of the Council of Graduate Schools, where he served as Board Chair in 2016, and a member of the GRE Board of Directors. In August 2017, Smith joined the University of Texas at Austin as Senior Vice Provost for Academic Affairs and Dean of the Graduate School. Dean Smith's scholarly interests are in the area of digital signal processing. He is a Fellow of the IEEE and a former IEEE Distinguished Lecturer. He has authored many technical papers, six international standards publications, three textbooks, and two edited books, the most recent of which is the 2014 edited book *GPS for Graduate School—Students Share Their Stories*.

Professor Rachel Spronken-Smith

Rachel Spronken-Smith is Dean of the Graduate Research School at the University of Otago, Dunedin, NZ. She initially trained as a geographer, taking up a lecturing position at the University of Canterbury, NZ, where she worked for nine years after returning from completing her PhD in British Columbia. Her teaching has been recognized with a University of Canterbury Teaching Award in 2002, an OUSA Supervision Award in 2012, a University of Otago Teaching Award in 2013, and a National Sustained Excellence in Teaching Award in 2015. After gaining a Postgraduate Diploma in Tertiary Teaching, Rachel changed her academic career and accepted a position as a Senior Lecturer in Higher Education at the University of Otago in 2004. She worked as an academic developer and was head of the department from 2009-2012. She became Dean of the Graduate Research School in 2013, and she continues to be actively involved in teaching, supervision and research. Her research interests in higher education include undergraduate research and inquiry, curriculum change, graduate outcomes and, in more recent years, doctoral education. Rachel won the 2016 TERNZ-HERDSA medal for Sustained Contribution to the Tertiary Education Research Environment in New Zealand, and gained a Fulbright Scholar Award in 2016, for research on doctoral education in the US in 2018. Rachel is currently chair of the New Zealand Deans and Directors of Graduate Studies.

Professor Eiríkur Stephensen

Eiríkur Stephensen earned his Ph.D. from the Department of Zoology/Zoophysiology at Gothenburg University, Sweden with an emphasis on ecotoxicology. His research focus was on antioxidant defenses in fish exposed to prooxidative xenobiotics. After graduating in 2003 he worked as a Quality Control Manager for a small Icelandic innovation company in the pharmaceutical industry for five years before joining a former colleague in his research on radiation damage to biomolecules at the Science Institute, University of Iceland. In 2010 Eiríkur joined the Icelandic Research Council where he served as a senior adviser for 5 years working mainly for the Icelandic Research Fund and the Icelandic Research Infrastructure Fund. He was hired as the Managing Director of the Graduate School, University of Iceland in late 2015.

Dr. Henriëtte van den Berg

Dr. Henriëtte van den Berg is currently serving as the chairperson of the Postgraduate Forum of Southern Africa. During the last five years, she worked as Director of the Postgraduate School, University of Free State and is still involved with research capacity development

and strategic postgraduate development at various South African universities. She started her academic journey at North-West University, South Africa, completing a Bachelors, Honours and Master's degree in Psychology and registered as a counselling psychologist with the Health Professions Council of South Africa in 1986. During the next ten years, she worked as a psychologist at various hospitals and university counselling centres. After completion of her Ph.D. in Psychology at the University of Free State in 2001, she joined the Department of Psychology, as lecturer and Programme Director of the Clinical and Counselling Psychology Programme. After ten years of postgraduate teaching and supervision, mentoring of emerging researchers and principal researcher of various research programs, her appointment as Director of the Postgraduate School changed the focus of her career from her research, postgraduate teaching and research supervision to enhancing the quality of postgraduate training at the university. Her role as director of the Postgraduate School created opportunities for collaboration with national and international institutions, funding organizations and other postgraduate stakeholders such as VITAE and DDOGS Australia. She currently works as an education specialist on various national doctoral projects and continues to supervise doctoral candidates in various disciplines.

Ms. Lesley Wilson

Lesley Wilson was educated at the Universities of Glasgow and Strasbourg and also has an honorary doctorate from the Université Pierre et Marie Curie in Paris. She joined the EUA at its creation in 2001 and took over as Secretary General in 2002. Prior to joining the EUA she held a number of senior posts in higher education and research management in various European and international organisations including the European Commission, where she was Director of Strategic Planning, Monitoring and Evaluation at the European Training Foundation in Turin (1999-2001), and UNESCO where she was Director of their European Centre for Higher Education, based in Bucharest, from 1995 - 1999. Before that she was Head of Policy at the European Science Foundation and also contributed to the development of EU education programmes through involvement in the launch phase of ERASMUS and as of 1990 as the Director of the newly established EC TEMPUS Office in Brussels. Her early career was spent in the German Science Council in Cologne.
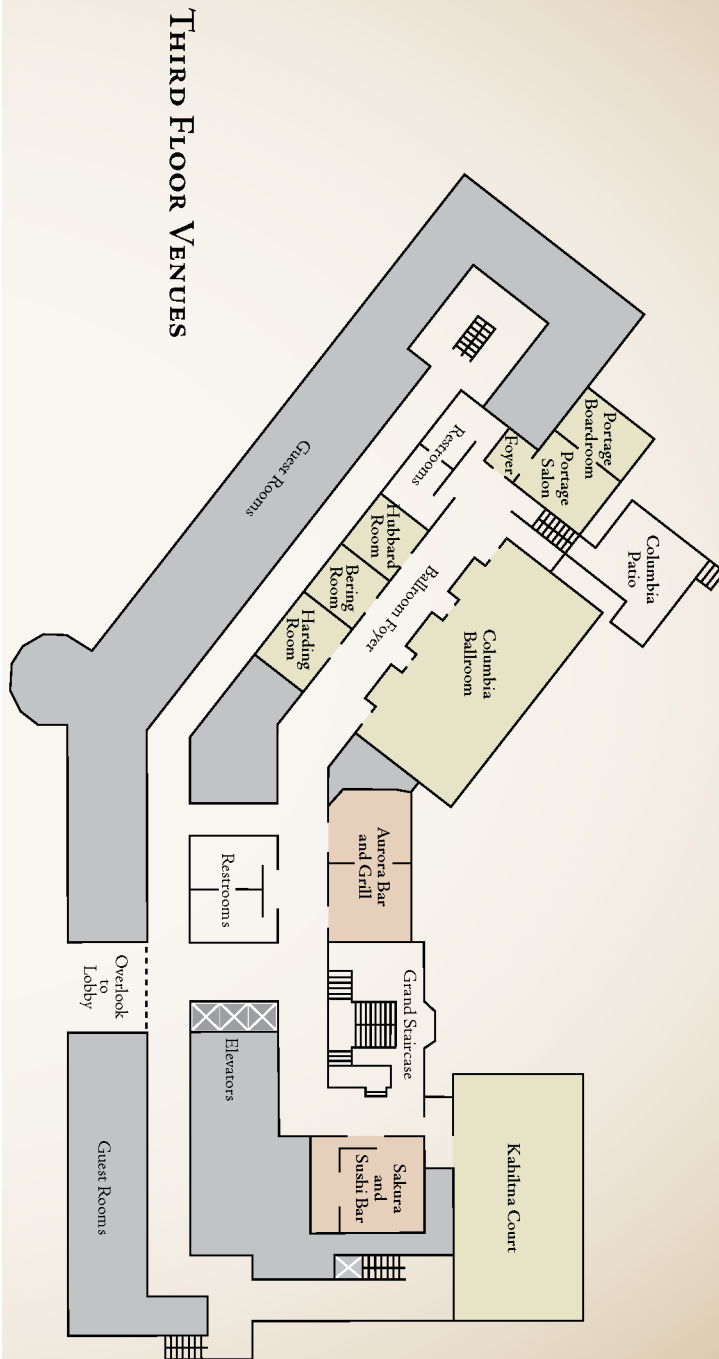
Dr. Shinichi Yamamoto

Dr. Shinichi Yamamoto is Dean of Graduate Studies and Professor, Graduate School of Higher Education Administration, at J. F. Oberlin University in Tokyo, Japan. He had worked for two universities, University of Tsukuba (1992-2006) and Hiroshima University (2006-2012) before being a faculty member of the current university in 2012. At Hiroshima University, he served as Professor and Director of Research Institute for Higher Education. His main concern is analysis of various functions of higher education system, including university research, administration and management. After graduation from the University of Tokyo (Bachelor of Law) in 1972, he served for the Ministry of Education for 20 years, where he got administrative experiences in school education, university and research/development, and international affairs. Regarding academic degrees, he got Master of Economics (University of Tsukuba) in 1977 and Ph.D. in higher education research (University of Tsukuba) in 1996. His recent publications in English include Doctoral Education in Japan (Stuart Powell and Howard Green Ed., *The Doctorate Worldwide, 2007*, Open University Press, pp.181-193), and Quality Assurance and Higher Education in Japan (Terance W. Bigalke and Deane E. Neubauer ed. *Higher Education in Asia/Pacific, 2009,* Palgrave MacMillan, pp.111-120).

Dr. Lisa Young

Lisa Young has served as Vice Provost and Dean, Graduate Studies at University of Calgary since 2012. During her time as Dean, she has focused on expanding the mandate of the Faculty of Graduate Studies to promote professional development opportunities for graduate students and encourage development of excellent supervisory practice. A Professor of Political Science, she has published books and articles examining Canadian political finance, political party organization and women in politics. She has served on the board of the Canadian Association for Graduate Studies, is Vice President of the Western Canadian Deans of Graduate Studies, and is a member of the board of the Canadian Federation for the Humanities and Social Sciences.

Third Floor Venues

Guest Rooms

Portage Boardroom

Portage Salon

Foyer

Restrooms

Columbia Patio

Hubbard Room

Bering Room

Harding Room

Ballroom Foyer

Columbia Ballroom

Restrooms

Aurora Bar and Grill

Overlook to Lobby

Elevators

Grand Staircase

Guest Rooms

Sakura and Sushi Bar

Kahiltna Court

THE HOTEL ALYESKA MEETING VENUES