Quality Network for Universities.

Insights From the 2016 Innovation Study Tour to San Francisco
Quality Network for Universities: Insights From the 2016 Innovation Study Tour to San Francisco
Matthew McKean

Preface

In February 2016, the Quality Network for Universities travelled to California to learn about and build connections to research innovation and commercialization. This report presents findings from the trip derived from presentations given to the delegation. It is organized thematically to reflect the “concept to commercialization” pathway characteristic of the California/Silicon Valley innovation ecosystem. Success in innovation in San Francisco and the Bay Area stems from close collaboration among higher education, government, business, and industry. To build and maintain similar relationships, Canadian universities must ensure that their basic research remains strong, while also becoming more attentive to collaborative and partnership opportunities.


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EXECUTIVE SUMMARY

Quality Network for Universities: Insights From the 2016 Innovation Study Tour to San Francisco

At a Glance

- The Quality Network for Universities (QNU) travelled to California to learn about and build connections relating to research innovation and commercialization.

- Success in innovation in San Francisco and the Bay Area stems from close collaboration between higher education, government, business, and industry.

- To build and maintain relationships with industry, Canadian universities must ensure that their basic research remains strong while becoming more attentive to collaborative and partnership opportunities.
In February 2016, The Conference Board of Canada’s Quality Network for Universities (QNU), a platform for university leaders to explore issues critical to their institutional missions (see “Quality Network for Universities”), conducted a study tour to San Francisco and the Bay Area. The goal was to learn about and build connections relating to research innovation, commercialization, and best practices in universities working with industry.

Quality Network for Universities

The Quality Network for Universities is a long-standing and distinguished network of Canadian university leaders. Each year the group travels across Canada and internationally to identify new opportunities and strategies around topics critical to the university mission and to organizational effectiveness in general, drawing on research and leading practices from across sectors. During the trips, the group explores and discusses the implications of national and international trends with university executives, policy-makers, and leading thinkers; and engages in candid discussion of common challenges with colleagues and leaders from various sectors. International trips have included visits to governments and higher education institutions in Germany, India, Turkey, the United Kingdom, Brazil, and Australia.

Through our visit to the University of California at Berkeley and a presentation from the Lawrence Berkeley National Lab, the group learned about the California Master Plan for Higher Education, including issues related to governance, faculty management, internationalization, and tech transfer. Visits to the University of California at Davis, Stanford University, and the Wiki Ed Foundation focused on teaching and learning and the comparative Canada–United States student experience.
Additional stops at Johnson & Johnson Labs, RocketSpace, IDEO, Google’s Advanced Technology and Projects group, and Singularity University provided opportunities to explore the “innovation ecosystem” from concept, design, prototyping, and start-up through to business development, business–education relationships, commercialization, and internationalization.

Our trip included a special visit with Brandon Lee, Consul General of Canada with accreditation for northern California and Hawaii, at the Consulate General of Canada in San Francisco. Mr. Lee, along with board members from the Digital Moose Lounge, a community of Canadians in San Francisco and the Bay Area who help newcomers build their social and professional networks, emphasized what Canadian universities can do to engage in Silicon Valley and the impressive number of Canadians who are already there.

Much of what we accomplished on the trip was made possible by the rich Canadian presence in the region and the willingness of the expat community (a.k.a. #SFBayCanadians) to open their doors to us.

What follows is a summary of key findings, derived chiefly from presentations given to the Q nU delegation. The report is organized thematically to reflect the comprehensive “concept to commercialization” pathway characteristic of the California/Silicon Valley innovation ecosystem, including the role played by public and private post-secondary education (PSE).

**Future Directions**

Participants were able to identify ways in which Canadian universities could improve based on the insights they acquired on the trip. Included in this report are some examples, by no means exhaustive, of where Canadian universities are well ahead of the curve. Opportunities for growth include:

- Collaborative, interdisciplinary research and teaching—Students are the centre of universities and must be provided with multiple ways to develop their intelligence, collaborate with peers, and find pathways to success. Success in innovation is a product of cross-sector collaboration.
• Strong interactions with industry start with strong basic research—Universities need to focus on producing strong basic research, which can then be commercialized through relationships with industry partners. Success comes from augmented marketing and engaging with the business side of higher education through more inclusive financial models and the participation of the university’s administration and finance employees.

• The need to embrace change, disruption, and failure—Since outcomes cannot be easily predicted, the PSE sector as well as government funders need to embrace failure as part of the innovation process.
CHAPTER 1
Post-Secondary Education in California

Chapter Summary

- The University of California (UC) Master Plan regulates the differentiation of functions in California’s post-secondary education (PSE) system, admission standards, including student fees and aid, and the governance of institutions in the UC system, replete with a coordinating body.

- All faculty in the UC system are part of the Academic Senate and play an indirect role in virtually every major decision.

- Canada is the fourth-highest contributor of international students at UC Berkeley, with 6 per cent of the total international student enrolment in 2014.
UC Berkeley and Higher Education in California

Established in 1868, UC Berkeley is a public research university located in Berkeley, California. It is home to 37,581 students (27,126 undergraduates and 10,455 postgraduates) in over 170 academic departments and programs. UC Berkeley places 13th in the Times Higher Education World University Rankings 2015–2016 and is one of six university brands that lead in world reputation rankings in 2015–16. It is credited for its diverse collection of social and scientific contributions and discoveries, with eight Nobel laureates on staff (as well as 29 among its alumni) and four Pulitzer Prizes held by its current faculty.

UC Berkeley is the flagship campus in the University of California’s PSE system, which is governed by California’s far-reaching and ambitious Master Plan for Higher Education. The Master Plan includes the University of California’s public university system, with 238,000 students across 10 campuses; the California State University system, with 460,000 students spread across 23 campuses; and the California Community Colleges, which feature a robust transfer system—especially for immigrant students—with 2.1 million students at 113 colleges.

1 Berkeley University of California, By the Numbers.
3 UC Berkeley News, UC Berkeley’s 22 Nobel Prize Winners.
4 University of California, The UC System.
5 The California State University, The California State University Fact Book.
6 California Community Colleges Chancellor’s Office, California Community Colleges Key Facts.
In response to enrolment growth, rising costs, and institutional competition, the California Master Plan for Higher Education was developed and signed into law in 1960. It aimed to ensure that anyone could get a university degree, regardless of economic background. This concept succeeded in organizing competing universities into a coherent system, while providing high-quality education to all. Another of its defining features was its success in differentiating the functions of three public higher education systems by encouraging each to create excellence in different areas, which prevented the duplication of public resources.7

One Board of Regents and one president, along with one chancellor at each of the 10 campuses, govern the University of California’s university system. Nine of the UC campuses are general, offering a cross-section of bachelor, master’s, doctorate, and professional degrees. UC Berkeley is the oldest university in the UC system, second in size only to UC Los Angeles (43,239 enrolled in 2014), while UC Merced is the newest (founded in 2005) and has the smallest student enrolment (at 6,268).8

The UC Master Plan is both a great idea and a flawed one, said Dr. Ellen Switkes, Assistant Vice President Emeritus. Reasons for success include the shared mission and governance structure; rigorous faculty hiring and review processes; location; constitutional autonomy; and the system’s capacity for multidisciplinary research.

The system’s single mission and common set of admission standards set out to ensure a “student body of exceptional promise and ability at all campuses.”9 Common standards also apply to faculty across the UC campuses. Faculty are provided with resources for success and assistant professors are reviewed every two years for salary increase. Committees are formed to evaluate the credentials of faculty applicants, while full-time faculty remain actively involved with and concerned about

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7 The University of California Office of the President, California Master Plan for Higher Education.
8 University of California, Annual Financial Report 14/15.
9 Gardiner, The California System.
the quality of their colleagues. The peer review process, which uses a faculty achievement “step” scale, is intended to encourage superior performance throughout the course of a faculty member’s career.10

Except for UC Santa Cruz, regular faculty are not unionized.

Remarkably, all regular faculty are members of the Academic Senate, which translates to 12,600 voting members across the UC system, with 1,650 at UC Berkeley alone. This long-standing arrangement was put in place in 1920, when the Board of Regents delegated authority over courses of instruction, curricular requirements, and standards for student admission. The Academic Senate, said Switkes, plays an indirect role in virtually every major decision.11

Why Does the UC System Share Governance With Faculty?

In short, the system recognizes that faculty are the source of specialized knowledge and creativity, and it aspires to maximize those abilities. Inclusion of faculty in governance also enhances faculty allegiance to the university. Faculty believe they own the university, said Switkes, and in a sense they do: faculty (along with students) make the system and their universities what they are and the assumption within the UC system is that involving more minds makes for better decisions. With shared governance, moreover, serious disputes between administrators and faculty are less likely.

The Academic Senate has direct authority over all courses, degree requirements, and curricula; it sets conditions for admission and institutional self-organization. Meanwhile, the Academic Senate

10 University of California, Faculty Review and Compensation.

11 The content, including any direct quotations, pertaining to UC Berkeley, Higher Education in California, and the “Sources of Stress in the UC System” subsection, derives from Ellen Switkes, “The Conference Board of Canada,” PowerPoint presentation held at Berkeley, February 23, 2016.
shares authority over academic advancement and program review and maintains a mutual right to be consulted, but not necessarily to decide on major issues, such as the budget.

Ensuring faculty success means hiring the right people; mentoring; regular reviews; regular post-tenure evaluation; and fair distribution of compensation, workload, and resources. The criteria for appointment and advancement focus on:

- Teaching—Faculty must clearly demonstrate evidence of high-quality teaching.
- Research and creative work—Faculty must show evidence of a productive and creative mind.
- Professional competence and activity—Faculty must show evidence of achievement and leadership.
- University or public service.

Faculty reviewers in the UC system include departmental colleagues and chairs; deans; ad hoc committees (for promotion only); a committee on academic personnel; and the chancellor. The committees meet regularly, and service on a faculty adjudication committee is considered prestigious work. Some 70 per cent of applicants in the UC system get tenure, though many leave for better jobs or because their home institution was not the right fit. About 85 per cent of UC Berkeley’s faculty entering class gets tenure.12

As faculty become more senior, the criteria for promotion gradually shift to excellence across a number of areas. A professor can get tenure for brilliant research and nothing else, but pay increases come from excellence in all fields, including teaching, administration, and public service. The University of California provides faculty with a detailed review and compensation guide, which outlines standards that must be achieved prior to tenure attainment. For all tenured professors, “superior

12 Switkes, “The Conference Board of Canada.”
intellectual attainment, as evidenced both in teaching and in research or other creative achievement, is an indispensable qualification for appointment or promotion to tenure positions.”\textsuperscript{13}

Review of progress through the ranks typically happens every two to three years, but a professor must get reviewed at least every five years. Most professors are reviewed for tenure in year five or six, and promotion in rank usually comes with tenure.\textsuperscript{14} Every two-year review includes review for salary increase. There are no regular cost of living increases for faculty. Layoffs and salary cuts are not unheard of.\textsuperscript{15}

Most Canadian universities have similar faculty review processes to the UC system. It takes three to seven years to reach tenure, typically five to six years. Professors are evaluated on their excellence in research, competence in teaching, and service to their institution, and must provide evidence of their contributions in each of the three categories. Faculty are provided with the tenure process in their collective agreement. As part of this agreement, faculty are evaluated through a pre-tenure review during the third year of appointment. With tenure comes the title of associate professor, the step before full professor, which requires faculty to provide evidence that they meet certain criteria at a “significantly elevated level.”\textsuperscript{16}

Similar to the Canadian university system, the UC system does not require mandatory retirement. There is, however, an ongoing push to make practical changes for practical reasons. Proposals to demote or dismiss faculty for incompetence have been greeted with alarm, though they were meant to help develop a series of warnings and hearings that might otherwise compel aging or incompetent faculty to retire or leave. Retired faculty have myriad benefits and remain members of the Academic Senate.

\textsuperscript{13} University of California, Faculty Review and Compensation.
\textsuperscript{14} Ibid.
\textsuperscript{15} University of California, University of California Academic Personnel Manual.
\textsuperscript{16} Gravestock and Gregor Greenleaf, Overview of Tenure and Promotion Policies Across Canada.
All faculty are required to do community service, beyond teaching and student advising, and a great deal of the work involves addressing equity issues pertaining to pay; workload distribution (teaching, committees and service, student advising); and access to resources, such as space, equipment, or the three national research laboratories in the UC system. Most of the institutions have organized research units, of which there are more than 80 at UC Berkeley alone.

**Sources of Stress in the UC System**

While faculty hiring and promotion processes may not mirror faculty experiences at Canadian universities, sources of stress in the UC system will no doubt sound familiar. At just 11 to 14 per cent of total operating revenues, limited state support at UC Berkeley means tight budgets and a heavy reliance on tuition, private gifts, grants, and contracts from all levels of government as well as other revenue-generating auxiliary enterprises and educational activities. Endowment and investment income generates only 2 per cent of UC Berkeley’s operating revenues.

Faculty salaries and retention remain constant stressors, especially with competition from well-funded private universities. Salaries and wages account for 42 per cent of UC Berkeley’s operating expenses. The other 58 per cent is spent on employee benefits (10 per cent); pension and retiree health benefits (9 per cent); scholarships and awards (5 per cent); supplies and materials (6 per cent); utilities (2 per cent); depreciation and amortization (7 per cent); and an “other operating expenses” catch-all (19 per cent).17

Faculty salaries account for a large percentage of university operating budgets in Canada as well. In Ontario, the average university spends about 57 per cent of its funding on salary and benefits, followed by buildings (7 per cent); scholarships and bursaries (6 per cent); communications and computing (5 per cent); furniture and equipment (4 per cent); an “other” operating expenses catch-all (11 per cent); and

17 Switkes, “The Conference Board of Canada.”
10 per cent divided between utilities, travel, interest, library acquisitions, equipment rental and maintenance, materials and supplies, renovations and alterations.\textsuperscript{18}

While many students go into the system expecting to get a four-year degree, too many end up leaving to do something else, said Switkes. Meanwhile, the ability to maintain access for all eligible students remains a challenge, as does growing and promoting the diversity of UC Berkeley’s student body and faculty. The need to increase enrolment persists. And with such limited state support, it is perhaps safe to ask whether UC universities, Berkeley especially, can justly call themselves public anymore.

All other American states have some form of higher education coordination; common standards for admission; and common standards for faculty across campuses. UC Berkeley sets itself apart through the Berkeley Global Campus initiative, its relationship with the massive Lawrence Berkeley National Lab, and its Canadian Studies Program.

**Canadian Studies at UC Berkeley**

Canada is the fourth-highest contributor of international students at UC Berkeley, with 6 per cent of the total international student enrolment in 2014, following China (32 per cent), South Korea (14 per cent), and India (19 per cent). In 2014, 360 students from Canada enrolled at Berkeley: 216 undergraduates and 144 graduate students. By comparison, China sent 1,802 students in 2014 to the UC Berkeley campus: 1,237 undergraduates and 565 graduate students.\textsuperscript{19}

Although Canada supplies a relatively small proportion of the total international student body, which in 2014 fell by 0.55 percentage points from the year before, the enrolment of Canadian students at UC Berkeley remains an important component of the human exchange, said Dr. Irene.

\textsuperscript{18} Ontario Undergraduate Student Alliance, *Rising Costs*.
\textsuperscript{19} UC Berkeley International Office, *International Student Enrollment Fall 2014*. 

Find Conference Board research at www.e-library.ca.
The Centre for Canadian Studies is a point of contact for visiting dignitaries.

Bloemraad, Professor of Sociology and Thomas Garden Barnes Chair in Canadian Studies. More contact yet is made through faculty research exchanges and through the Canadian Studies Program.

Long-standing Canada–US relations and a mutual interest in comparative research topics led to the creation of the Canadian Studies Program at UC Berkeley. The Centre, established in 1982, offers public programming and a research agenda focused around issues of immigration, the Arctic, the environment, energy, and Indigenous studies. “It also serves as a nexus for Canadians and friends of Canada in the Bay Area and beyond, including UC Berkeley’s growing population of Canadian students, as well as faculty, policy-makers, technology leaders, and members of the public who seek a ‘beyond the headlines’ analysis of issues in Canada.”

The Thomas Garden Barnes Chair in Canadian Studies directs the program. Named after the program’s founder, the chair was first held by Nelson H. H. Graburn, Professor of Anthropology at UC Berkeley and Co-Director of the Canadian Studies Program, from 1986 until 2012, when Dr. Bloemraad assumed the role. Canadian Studies at UC Berkeley is a research unit, minus a teaching component. Canada, alas, is not a popular topic among UC Berkeley’s undergraduate population. More attention is paid to cross-border politics in New England’s universities.

But the Centre for Canadian Studies maintains a lively events calendar, with speakers and colloquia. Recent conferences have examined jurisdictional struggles over oil and gas development, Indigenous self-governance, Inuit film-making, and comparative disability law. The Centre is also a point of contact for visiting dignitaries, including governors general, former prime ministers, and Supreme Court justices. Governor General David Johnston’s first official visit to California was hosted by

20 UC Berkeley Canadian Studies Program, About the Canadian Studies Program.
UC Berkeley’s Centre for Canadian Studies. While there may not be an enormous demand for Canadian studies, there remains a deep well of interest.21

**Berkeley Global Campus and the Lawrence Berkeley National Lab**

The Berkeley Global Campus initiative aims to build on the university’s international reputation by becoming a focal point for global exchange and research collaboration. Launched in 2014, with funding from the Lawrence Berkeley National Lab (LBNL), the campus (still under construction) will be located in close proximity to Berkeley’s main campus and the nearby LBNL.

The future research and teaching hub aspires to turn the global engagement model on its head: rather than build a campus overseas or launch international projects in foreign countries, UC Berkeley aims to create an international campus on American soil and bring collaborators from around the world to California. The goal is to align UC Berkeley’s existing resources and community stakeholders with international partners. In this way, the benefits of the international exchange are expected to be felt throughout the local community.

Education will play an important role. Students will tackle global challenges through applied, interdisciplinary undergraduate and graduate programs. Dr. Nils Gilman, Strategic Advisor to the Chancellor, explained that the initiative will enable synchronous, multilateral collaboration between universities, meaning that Berkeley Global Campus will not confer joint degrees, but will enable students to get a degree from more than one institution at the same time.

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21 See the International Council for Canadian Studies (ICCS) website for more information about Canadian Studies programs offered around the world. Currently, there are 38 countries that have academic institutions offering courses in Canadian studies, with a total of over 7,000 academic researchers worldwide. UC Berkeley is listed in the ICCS Database at [www.iccs-ciec.ca/files/CdnSt-ctrs.pdf](http://www.iccs-ciec.ca/files/CdnSt-ctrs.pdf).
The Berkeley Global Campus initiative will build upon the resources and international reputation of the LBNL, which is a Department of Energy national lab managed and operated by the University of California. LBNL conducts research in a variety of scientific and engineering fields, focusing on four key areas: national nuclear security administration; environmental management; applied energy research; and basic science.

Home to more than 3,000 scientists, engineers, and support staff, LBNL ran on an $811-million operating budget in 2015 and contributes approximately $700 million a year to the San Francisco and Bay Area economy. A 2010 study found that the Lab was responsible for some 12,000 jobs across the country and contributed $1.6 billion a year to the national economy.22

More than one presenter commented on the value of having a federally funded government lab of this size (97 buildings on 202 acres), scope (16 core research capabilities), and prestige (13 Nobel Prize winners, 13 National Medal of Science recipients, 70 members of the National Academy of Sciences), near and connected to a major university.

Tech transfer or tech-to-market (T2M) efforts constitute the Lab’s economic impact in the region and across the country. LBNL’s Innovation and Partnerships Office aligns the Lab’s commercialization and licensing efforts to the technology landscape, said Dr. Elsie Quaite-Randall, LBNL’s Chief Technology Transfer Officer. The Office maps the Lab’s intellectual assets; and develops tech assessments, clear intellectual property protection and maintenance strategies, and mechanisms to expedite enterprise spin-out.

The Office remains alert to the innovation ecosystem and drives industry interest through partnerships and industry consortia. It engages external investors and entrepreneurs; communicates innovation and entrepreneurial resources to the lab community; and provides entrepreneurial training, entrepreneurial leave, innovation grants, and

22 Lawrence Berkeley National Lab, About the Lab; Miller, Herman, and Bain, Berkeley Lab Economic Impact Study.
grant-writing support. LBNL’s tech transfer office collaborates with UC Berkeley research units and creates training/experiential research and learning opportunities for UC Berkeley students.

Many Canadian universities have established technology transfer offices to support research and collaboration between the university and community. For example, the University of Manitoba, University of Waterloo, University of Windsor, and University of Ottawa have established offices whose main role is to transfer research discoveries to industry partners, develop research commercialization opportunities, facilitate research partnerships, and convert research into marketable products. These offices also work to protect intellectual property and research discoveries.

The University of Waterloo’s Commercialization Office (WatCo) provides a directory of current research projects in the fields of engineering, physical sciences and materials, information technology and hardware, life sciences, groundwater remediation, and software. Each research project is accompanied with a description of the invention, as well as a list of advantages and opportunities for practical application. This provides businesses with the information necessary to understand the available inventions and their potential uses, so that they can decide whether or not they would like to contact the university and get involved with the project.

These projects also provide information about patents as well as the stage of development they are in. Through the creation of technology transfer offices, Canada’s PSE institutions are investing in the mechanisms necessary to create and support relationships with the business community, which in turn creates innovation opportunities.

23 For more information on technology transfer offices in Canada, please see the following websites: http://umanitoba.ca/research/tto/about_the_tto.html; https://uwaterloo.ca/research/waterloo-commercialization-office-watco; www1.uwindsor.ca/oris/technology-transfer; https://research.uottawa.ca/ttbe/.
CHAPTER 2

Teaching and Learning

Chapter Summary

- University of California, Davis (UC Davis) has a Centre for Educational Effectiveness, which works hands-on with instructors to develop course innovations through assessment, design, collaboration, and technology.

- The Wiki Ed initiative is working to provide students with the opportunity to contribute to knowledge.

- Stanford University’s research environment focuses on collaboration and creativity, includes an abundance of informal and diverse networks, and encourages student entrepreneurship.
UC Davis Centre for Educational Effectiveness

The UC Davis Centre for Educational Effectiveness works with faculty, instructors, and graduate students “to implement evidence-based instructional practices and develop and explore innovative solutions that enhance learner-centered instruction.”

The Centre offers instructional training for faculty and teaching assistants through meetings, consultations, courses, and workshops, and works hands-on with instructors to develop course innovations through assessment, design, collaboration, and technology. (See “UC Davis Centre for Educational Effectiveness.”)

UC Davis Centre for Educational Effectiveness

The UC system’s most northern campus, UC Davis was founded in 1905. It neighbours Sacramento, California’s capital city, and has received numerous prestigious domestic and international honours and awards, positioning itself among the top 40 universities in the world. With 104 majors and 96 graduate programs, UC Davis has a total student population of 35,415 and a 60:40 female-to-male ratio. The university stands out for its strong reputation in solving problems related to sustainability, the environment, food, health, and for its commitment to student learning and innovative instructional solutions.

But it does not stop there. The Centre evaluates and assesses student learning through a variety of testing methods, aggregates data, and analyzes student success through advanced analytic tools. UC Davis’ sophisticated measurement of student learning goes inside programs,

1 UC Davis Centre for Educational Effectiveness, About Us.
2 UC Davis, Facts.
explained Dr. Marco Molinaro, Assistant Vice Provost for Educational Effectiveness, to see how they are delivered, when students take them, and the learning outcomes.

Educational analytics, such as the UC Davis Ribbon Tool, track student pathways between majors and disciplines over time, while a new Heat Map, still in development, will chart in which years students take particular courses, courses with the highest rates of below-average grades, courses with the highest failure rates, and where programs lose students, enabling the Centre and the programs it supports to focus their instructional, development and research efforts for performance improvement.

A Generalized Observation and Reflection Platform performs classroom observation and collects and analyzes data on active learning techniques, while a Cold Caller app allows faculty to randomly call upon students in class. An Event Tracker app shows teachers which learning-related services or events students have participated in. The Centre’s goal, said Dr. Molinaro, is to understand the impact of pedagogy and curriculum against the characteristics of students, including student pathways and the factors that cause migration, in order to inform research into student success and improve the university’s retention practices.

The UC Davis Centre for Educational Effectiveness is deconstructing the student–teacher–course experience as a basis for one of the most sophisticated approaches to learning-based data-gathering, measurement, and analysis in the UC system. The Centre’s initiatives go beyond the mandates of a traditional teaching and learning centre. The majority of Canadian universities offer information, workshops, and professional development programs to faculty, instructors, and teaching assistants, but stop short of collecting data on the impact of their programs or fostering innovation in teaching and learning.3

For example, the UC Davis Centre has also undertaken major studies of the impact of curved grading and the use of WikiTexts on student learning outcomes. A ChemWiki initiative in 2014, which compared the use of

3 Grabove and others, Teaching and Learning Centres, 5.
costly commercial textbooks with open-access alternatives, found that “no statistical differences existed in either class’s performance.” In other words, WikiTexts were effective enough to replace traditional textbooks.

The Wiki Ed Foundation

The Wiki Ed Foundation, a spinoff of the Wikimedia Foundation, the not-for-profit organization that runs Wikipedia, aspires to expose yet more students to open learning opportunities. Established in 2013, WikiEd's mission is to help university instructors build course assignments that enable students to produce course-related content on Wikipedia. Through these exercises, students develop technical and communication skills around reading, writing, research methods, critical thinking, and experiential approaches to media literacy.

The Wiki Ed initiative aims to bridge the gap between higher education and Wikipedia by placing students in a new learning context, said Jami Mathewson, the Wiki Education Foundation's Educational Partnerships Manager. Through the experience, students feel like they are contributing to knowledge, not just consuming or regurgitating it. It also enables students to take a proactive role in identifying what is missing from Wikipedia, who is missing, and what constitutes a quality entry.

Wiki Ed Foundation presenters insist that, at present, 90 per cent of “Wikipedians” are white, Western, middle-class, educated males in the 18 to 36 age range. The overwhelming majority of Wikipedia articles focus on warfare; sports; video gaming; business, economics, and finance; geology and geophysics; and language and linguistics. While teaching and learning data show that males are underperforming in educational settings, Wikipedia shows that males are the most engaged group. One of the primary goals of the Wiki Ed initiative, however, is to diversify its contributors and content. The foundation is working hard to increase the participation of women.


5 Wikimedia, Wikimedia Users.
Students focus on filling content gaps on Wikipedia; they synthesize and assemble knowledge in what Wiki Ed’s creators hope will be meaningful and impactful ways. Through peer review, student training and support mechanisms, and the fact that Wikipedia remains the go-to resource following most web searches (receiving 500 million unique visitors and 20 billion page views a month), students are meant to feel that their work has real-world applications.

While UC Davis and the Wiki Ed Foundation work to enhance undergraduate student learning, Stanford University remains a world leader in graduate student education. Our visit to Stanford included two panel discussions with Canadian graduate students and faculty who are enrolled or teaching at Stanford. The goal was to provide participants with an overview of the unique and key role that Stanford plays in the Silicon Valley innovation ecosystem; to compare and contrast the student and research experiences in Canada and at Stanford; and to explore new approaches for Canadian universities to consider in university–industry relations and commercialization. (See “Stanford.”)

**Graduate Studies at Stanford University**

The graduate students we spoke with at Stanford had each completed at least one degree in Canada and all had come to Stanford to do graduate or post-graduate work in a variety of fields, including applied physics, computer and electrical engineering, communications, genetic counselling, earth sciences, engineering, and mechanical engineering, while the faculty members had both studied and taught in Canada. The group shared perspectives on their experiences with research as well as with teaching and learning in Canada compared with their experience at Stanford. Their insights focused on how graduate research works with industry, including start-ups and entrepreneurship.
Stanford

Stanford University is one of the world’s top research universities. Its areas of excellence range from humanities and social sciences to engineering and sciences. The university also maintains a strong and storied reputation for its entrepreneurial character, which is drawn from its close relationship with and proximity to Silicon Valley. Stanford is a privately funded institution, with 6,994 undergraduate and 9,128 graduate students supervised by 2,153 faculty members, which translates to an impressive 4:1 student-to-faculty ratio. Stanford places third in the Times Higher Education World University Rankings and is one of the top five university brands that lead in world reputation rankings in 2015–16.

A PhD student in applied physics began by suggesting that one way to attract good science, technology, engineering, and mathematics (STEM) PhDs to industry is for universities to value industry equally to a career in academia. It helps, too, the student went on to say, if STEM students focus more on research that contributes to industry and has commercial value. For the most part, it seems that Stanford is succeeding on this front.

A mechanical engineering PhD student explained that his classes were more project-based and geared toward developing “start-up-worthy” ideas. Multiple students emphasized the role and value of co-op and internship opportunities in providing real-life training, building relationships, and positioning graduates for employment.

Including companies in courses and projects is commonplace at Stanford, as is networking, sometimes even working on projects, with executives with Stanford pedigrees. Stanford benefits from a very large and growing endowment (US$22.2 billion in August 2015). “The university’s endowment payout for fiscal year 2015 was $1.06 billion, equal to 4.9 per cent of the beginning-of-year endowment value.”

6 Stanford University, Stanford Facts at a Glance.
Budgeted endowment payout for fiscal year 2016 is $1.15 billion. This helps provide enough funding for deans of research to oversee larger-than-usual centralized pots of money and resources, all of which lead to more opportunities for research support and collaboration.

While the U.S. and Canada have different funding sources for research, Canada may benefit from looking more closely at the types and structures of funding provided in the United States. The implication by the faculty and graduate students was that grants are more flexible, namely in terms of what they pay for, what directions they enable researchers to pursue, and what the deliverable could look like.

More than one student reinforced the point that Stanford's research environment is more collaborative than that in Canada and places more emphasis on creativity than on technical competence. Another emphasized the multiplicity of informal networks among diverse students, which leads to more creativity, interdisciplinarity, and collaboration.

Silicon Valley’s start-up culture clearly impresses upon Stanford graduate students, inspiring their entrepreneurial spirit and resulting in numerous companies being established by students even before graduation. The graduate students aspire through their work not just to make money, but to have an impact; and a recurring theme among the group was the idea of doing something nobody else can do. They set out to make substantive changes in their fields by combining their disciplinary specialization with their entrepreneurial ambition to create both for-profit and not-for-profit companies, and by taking advantage of their proximity to the Valley to find partners for commercializing their ideas.

CHAPTER 3

The Innovation Ecosystem and Incubator Spaces

Chapter Summary

- Silicon Valley’s “secret sauce” includes a willingness to talk with competitors, which leads to shared know-how rather than theft of intellectual property.

- One of the keys to building a more vibrant innovation ecosystem in Canada will be moving from closed to open innovation.

- Singularity University operates SU Labs, the world’s first accelerator program designed to assist start-ups in solving social issues using exponential technology.
The Innovation Ecosystem

Dr. Bill Miller, Herbert Hoover Professor of Public and Private Management Emeritus and former Vice President and Provost at Stanford, described Stanford’s unique and key role in the Silicon Valley innovation ecosystem. For starters, the university began as a “high-tech outfit” in 1885. Its role as a habitat for innovation, in other words, is not recent. Innovation has long been nurtured, surging in scale in recent decades as its environment became ever more receptive.

Fostering and sustaining innovation in the region required the development of entrepreneurial clusters well connected to industry, universities, and research institutes. According to Dr. Miller, Silicon Valley’s secret sauce for innovation includes the following:

- smart, ambitious people with tacit knowledge;
- rapid spin-offs, owing to the absence of non-compete clauses in California;
- a willingness to talk with competitors, which leads to shared know-how rather than theft of intellectual property;
- fast decision-making, which speeds the pace of innovation;
- global connections (more than half of the companies in Silicon Valley are founded by international entrepreneurs who have links back home, which also helps them find markets);
- an acceptance of failure. Failure, Dr. Miller said, is a terrific teacher. But the key is to fail fast, learn from failure, recover fast, and not to fail too often.

While California’s universities, both public and private, funnel students into Silicon Valley’s innovation ecosystem, the incubator programs in the region, such as Johnson & Johnson Labs (JLABS), are another significant point of contact. Located in South San Francisco,
JLABS focuses on providing an efficient and flexible platform where resident start-ups can transform emerging scientific discoveries into commercialized health care solutions.

According to Dr. Stephanie Robertson, Director, New Ventures, the JLABS model enables “scientists to focus on the science” and avoid business, financial, and operational obstacles. JLABS’ professional operational management and programming resources handle these responsibilities, allowing entrepreneurs to take advantage of being at a large firm, while preserving their equity and freedom to develop innovative solutions to problems.¹

JLABS provides a vehicle for up-and-comers to focus on emerging pharmaceuticals, medical devices, and consumer and digital health companies through the challenging period between early discovery and commercialization.² Its chief goal is to support new ventures. What’s particularly exciting about this model is the role that JLABS can play in shaping relationships by facilitating partnerships, licensing, and venture investment, and providing an impressive set-up for new companies to find their footing.

The business relationships it develops vary: in some instances it may co-develop, buy in, or help a start-up take a product to market, while in others it simply offers coaching/mentoring services. Where needed, it offers marketing help, speaking coaches, journalists, media relations, panels on specialized programming, and CEO roundtable meetings, as well as regular meetings with clients, while also maintaining an arm’s-length relationship. Companies apply via a non-confidential application process and undergo both internal and external reviews. The majority of JLABS’ alumni grow out of the JLABS space we visited in South San Francisco.

¹ Johnson & Johnson Innovation Labs, Reasons for Success.
² Johnson & Johnson Innovation Labs, Focus.
What Can Universities Learn From Incubator Spaces?

Dr. Robertson explained that the advantage of the academy is that it can tackle the 20-year horizon issues that others in incubator and accelerator spaces simply cannot. Researcher-professors are finding solutions to real problems. But universities, she went on to say, need more people in tech transfer and contract management, and who understand the importance of creating relationships within the innovation ecosystem. Universities are under-resourced and reactive in this way. The biggest hurdle is not having enough university-based people with perspective on and experience with bringing ideas to market, with backgrounds in agreement structures, and the ability to expedite the transfer process. They are also in short supply of people who know where and how to seek out industry and capital partners to engage in commercialization and market entry, domestically and internationally, said Dr. Robertson.

Larger Canadian universities have visited JLABS, but Dr. Robertson wondered whether there is a shift away from lab culture among Canadian universities and if too many academics still do not understand what a place like JLABS does. (See “Singularity University.”)

Singularity University

Singularity University is a public benefit corporation that runs educational programs, partnerships, and avenues to assist individuals, public and private sector organizations and non-governmental organizations to understand how to adopt and leverage innovative technologies for positive social change. Singularity University aims to use exponential technologies (technologies where the power or speed doubles annually, while the cost drops by half) to solve Global Grand Challenges (GGCs). These GGCs are interdependent, and by solving them, Singularity U hopes to ensure all people have their basic needs met, quality of life sustained, and future risk mitigated.3

3 Singularity University, Global Grand Challenges.
Headquartered at NASA’s Ames Research Centre, Singularity U uses its Silicon Valley location to offer intensive programs to future leaders, entrepreneurs, and technologists to help drive research areas like artificial intelligence, biotechnologies, and neuroscience to address many of humanity’s critical challenges. Since its inception in 2008, Singularity’s alumni, partners, and members have generated over 100 start-ups, along with numerous patents and ideas.4

Singularity University operates SU Labs, the world’s first accelerator program designed to assist start-ups in solving social issues using exponential technology. SU Labs provides start-ups with $100,000 in seed funding, access to Fortune 500 companies, as well as a unique eight-week program that teaches participants how to scale their product to reach maximum impact. Start-up participants join cohort groups, working simultaneously to develop products. SU Labs’ first two cohorts were very successful, with 50 per cent of first-cohort companies closing successful rounds and 70 per cent of second-cohort companies receiving committed funding.5

For academic researchers, industry can be helpful by pointing out the differences between basic and applied research, noting that we cannot have one without the other. And while scientists like and need to stay focused on the science, they also need to know the “other stuff,” said James Viola, Marketing and Events Lead at JLABS. They should receive training in areas outside but related to their research, such as in health and safety, and communications. Communication remains key, as do success stories, and will help a place like JLABS bridge in academics.

Google’s Advanced Technologies and Projects (ATAP) group operates on a basic principle: give bright people money, space, and a defined period of time to ramp up their idea; if they fail, move them on to the next challenge. Speed is key. Like Google X, Google ATAP is a confidential skunkworks operation that focuses on in-house technology advancement.

4 Singularity University, What Is Singularity University?
5 Singularity University, We’re the SU LABS Startup Accelerator.
ATAP’s shorter product cycle periods allow just two years to transform concepts into feasible products. ATAP’s projects carry an initial high level of secrecy; once it is time for them to start developing public interest, they are typically announced at the Google I/O developer conference. Recent projects include advancements in wearable technology, virtual reality, and gesture-recognition technologies.6 (See “Design Thinking.”)

Design Thinking

Design thinking is a human-centered approach to innovation that draws from the designer’s toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success.7

—Tim Brown, President and CEO, IDEO

IDEO is a global design firm that uses the methodology of design thinking to assist public and private sector companies to grow and innovate. Since its inception in 1991 in Palo Alto, California, IDEO has grown substantially and now has locations throughout the U.S, in Munich, Shanghai, Singapore, and Tokyo, and has earned the reputation of one of the world’s most innovative design companies.8 IDEO also operates as a management consulting firm, whose expertise is building creative cultures to fuel innovation. As a design firm, IDEO specializes in launching new ventures, in which it designs products, services, and interactive experiences.9

Design thinking is the main concept that IDEO uses to create innovative products. IDEO describes design thinking as an approach that combines human desirability with what is technologically feasible and economically viable. This process provides tools to individuals to help leverage their creativity to solve numerous challenges, without having a formal background in design.10 Using

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6 Wikipedia, Google ATAP.
7 IDEO, About IDEO: What We Do.
8 Lee and Tischler, Most Innovative Companies.
9 IDEO, About IDEO: What We Do.
10 Ibid.
this vision, IDEO leverages numerous innovative techniques, such as data visualization, organizational design, and business model prototyping, to help its public and private sector clients envision and interpret the future.

Design thinking is in practice in Canada at Emily Carr University of Art + Design (ECUAD) in Vancouver and OCAD University in Toronto. According to ECUAD’s Dean of Design and Dynamic Media, Deborah Shackleton, “Design thinking is a mindset. You can use it as a tool or a technique. It’s very adaptable.”¹¹ ECUAD offers a Bachelor of Design program in which studies are “oriented toward sustainable design thinking that is embedded in understanding cultural contexts and ecology.”¹²

One example of how OCAD University teaches students the principles of design thinking is its Master of Design in Strategic Foresight and Innovation program. The mission of this program is to create a new kind of designer—a strategist who sees the world from a human perspective and re-thinks what is possible; an innovator who can imagine, plan, and develop a better world.¹³ Graduates learn how to analyze, synthesize, and strategize, while using creativity to develop innovative and future-enhancing solutions for companies in any sector.

Like employees of IDEO, graduates from OCAD University and Emily Carr University graduate with the skills to find solutions to complex problems that will assist in creating sustainable futures.¹⁴

Innovation needs a new approach, said Dan Kaufman, Deputy Director of Google’s ATAP group. ATAP, which has more than 500 partners, in 27 countries, on 5 continents, aspires to have people working in large groups on various projects as one fluid work unit, with technical project leaders who cycle in and out every two years. The work units are optimized for speed.

¹¹ Johnson, “Design Thinking Is Changing the Way We Approach Problems.”
¹² Emily Carr University of Art + Design, Bachelor of Design.
¹³ OCAD, Strategic Foresight and Innovation (MDes).
¹⁴ Ibid.
So, too, is Google’s Multi-University Research Agreement or MURA. Cameron Walker, who works on Google ATAP’s advanced technology projects, explained that MURA serves as a universal contract with the aim of expediting the contract process between Google ATAP and universities. MURA serves as the basis for the partnership and spells out funding procedures, intellectual property rights, and research publication rules. Since it was rolled out in 2013, a number of prominent schools, including Cal Tech, Harvard, MiT, Stanford, and Johns Hopkins, have signed on.

There is coming up with ideas; there is incubation, and then there is acceleration. Many incipient companies apply to RocketSpace for help with acceleration. The criteria to join RocketSpace, San Francisco’s premiere co-working space for tech and new media start-ups, is that a company needs to have secured at least one round of venture capital funding. Within months of setting up shop in 2011, RocketSpace had built an impressive list of tenants, including Uber, Zappos, Spotify, and Pocket Jams.

RocketSpace is a start-up accelerator located in the heart of San Francisco. Like most tech accelerators, its goal is to assist start-ups, tech entrepreneurs, and corporate professionals to bring innovative ideas to market. Founded by Duncan Logan, the company offers many resources to its members, including consulting, networking, and programming, which combine to mould an ideal innovation ecosystem to enable up-and-comers to succeed. RocketSpace has over 175 start-ups on campus as well as corporate partners around the world, and has over $13 billion in funds raised by members and alumni.15

Building a fundable company is the hardest part. To do so, said Logan, companies need to shift from capitalism to “talentism,” which changes the team dynamic and the monetization model. RocketSpace “manages to attract the best people because the best people want to hang out with the best people. Young people especially are products of their environment; and no matter what you want to do, people want to hang out with the best.” It is not what you have, but who you have.

15 RocketSpace, About.
RocketSpace advocates some radical ideas for educational change. This includes hiring people while they are still in secondary school and developing them along the sports-athlete model; it also advocates building more connections between corporations and universities, with the eventual goal of “selling” students to companies. Somewhere along the way, suggested Logan, students should be able to pick, choose, and purchase what post-secondary educational pieces they feel they need.

Venture capitalists are looking for what Logan calls the “multiplier people.” More importantly, venture capitalists are looking for enthusiastic founders who put together a good team and who listen to advice. “Entrepreneurs don’t build companies,” said Logan. “Entrepreneurs build the teams that build companies.” This is what draws the money. It is easy to raise money once you have a fundable company, said Logan.

Canada, Logan went on to say, has produced phenomenal intellectual property, but needs to make it easier to transfer. Canada is still protectionist about ideas, whether they originate in companies or universities, according to Logan. One of the keys to building a vibrant innovation ecosystem in Canada will be moving from internal to open innovation. Toronto is a hub in the making, though, and RocketSpace is on its way to set up an office there.

Canadian universities are creating business incubators and providing entrepreneurs with the tools and support necessary to grow their businesses. In Ottawa, Carleton University’s Lead To Win program was ranked seventh among all business incubators in North America by UBI Global. The program aims to make the National Capital Region an attractive place to grow businesses, while creating knowledge jobs. Ventures are run by PSE students and are expected to generate an annual revenue of $1 million within the first three years. The program provides students with the knowledge necessary to make technology businesses profitable. To join the program, venture teams must present at one of the twice-monthly Opportunity Reviews, where they pitch

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16 Lead To Win, About Us.
their ideas to panels of academics and members of the entrepreneurial community. Those who are successful are provided entrepreneurial support in the form of workshops, office space, and networking opportunities.17

Across town, the University of Ottawa’s Entrepreneurship Hub is experimenting with an apprentice-based model of entrepreneurship education that “will help students develop essential 21st century competencies, embrace continuous learning, and transform themselves as change ‘makers’ and opportunity creators.” This approach, said Luc Lalande, the Hub’s Executive Director, is inspired by Peter Drucker who famously said, “Entrepreneurship is neither a science nor an art. It is a practice.” Particular attention is devoted to the development of students’ innovation skills and entrepreneurial leadership in contrast to the launching of ventures, as popularized through university incubation programs.18
Chapter Summary

- The education sector has been targeted for disruption; disruption is the key to moving forward, and is the basis for profitable innovation and growth.

- Half of Silicon Valley’s unicorns (private companies worth $1 billion), or 42 of 85, were founded by immigrant entrepreneurs.

- Innovation is not a predictable process. One can design components, but should not try to over-determine the outcomes.
#SFBayCanadians (Canada in the San Francisco Bay Area)

The American Community Survey and community data provided by the Silicon Valley Institute for Regional Studies reveals somewhere between 18,800 and 25,000 Canadians living in the region, depending on which counties are included in the definition of “Silicon Valley,” while the U.S. Census Bureau estimates that for 2009–14 some 133,000 Canadians were living in the entire state of California.¹

Brandon Lee, Consul General of Canada in San Francisco, insisted that Canadians must celebrate our entrepreneurial success, both inside and outside of Canada, more than we do. “We are better than we think.”

Canadian companies in the region are also upping their game. The calibre of our thought, talent, expertise, and knowledge is world-class, but we need to balance it with business acumen.

Mr. Lee offered two observations:

1. Be mindful of the power of language. He himself decided to start using the past tense to describe how Canada used to be—the “used to be mindset” helps Canadians in Silicon Valley move forward.

2. The education sector has been targeted for disruption; it is widely talked about and disruption is the key to moving forward—it is the general methodology in Silicon Valley, which embraces disruption as the basis for profitable innovation and growth.

The Consul General offered two opportunities to Canada’s universities:

1. Develop applied learning tools, programs, and opportunities. The top three schools from which Silicon Valley recruits are Stanford, MIT, and Waterloo. The reason why, when they ask talent scouts, is...

¹ Migration Policy Institute, U.S. Immigrant Population by State and County.
because of their co-op programs. Students are graduating with two or three terms at places like PayPal, Google, etc. They already have the Silicon Valley mindset at the job interview. The ability to have applied learning, including internships, and entrepreneurial and social innovation opportunities, integrated within degree programs is a best practice for all universities to learn from and adopt.

2. The window of opportunity for tech transfer is getting shorter and shorter. Governments partnering with companies take 12 to 16 months, but the private sector is moving much faster, sometimes less than three weeks in Silicon Valley. A barrier in Canada is the intellectual property issue. Adopting a liberal approach to tech transfer and speeding up the process are essential. Year-long discussions about intellectual property by costly lawyers mean Canada’s companies are already behind the game before they launch. Stanford remains a best practice here.

Mr. Lee explained that priority areas for the Canadian consulate in California are energy/environment; cross-border issues; and security/defence. The fourth used to be universities and culture, but it was dropped. Canada’s universities need to get themselves back on California’s agenda. Partnering with Canadian universities remains a model for bringing people together.

Board members from the Digital Moose Lounge, a network of Canadians in the San Francisco and Bay Area that serves as a first point of contact and platform for social and professional connections between Canadians in the region, described their role in developing partnerships with Canadian universities in order to support events; sponsor regional-planning and intelligence-gathering; serve as a soft landing spot for Canadian co-op students; or generally help Canadians navigate and negotiate the California system.

The University of Waterloo is blazing a trail in this space, but the Consul General and organizations such as the Digital Moose Lounge are helping more of them find their way to the right people and places. The key to success, said Katherine Exon Smith, a consultant for the Canadian
immigrant bridging group, is that “people need to network without desperation.” The culture of failure as an avenue to success found in the Valley should be embraced by Canadians both in the Valley and at home.

There is enough high-calibre Canadian talent in the region to set up Canadian hubs, which in turn will help to move things forward. David Stewart, another consultant for the group, explained that half of Silicon Valley’s unicorns (private companies worth $1 billion), or 42 of 85, were founded by immigrant entrepreneurs. That’s one-third of the Valley’s biggest firms.

So immigrant communities are welcome and thriving; what is needed now are nodes for transferring back to Canada. While Silicon Valley is doing more to provide soft landings for newcomers, Canada needs to do more to provide soft landings for global firms, so that more of Canada’s talent returns and brings their new innovation ecosystems with them.

**Member Take-Aways**

We asked our member-delegates for three key insights from the trip. Their take-aways fall generally into three key categories:

1. **The Importance of Collaborative, Interdisciplinary Research, and Teaching:**
   - Talent, discipline, and creativity are the currencies in Silicon Valley, whether in industry or at the Bay Area’s universities.
   - Collaboration at Stanford is fundamentally the best approach to education and learning in the 21st century.
   - Students need to be at the centre of the universities.
   - Innovation and entrepreneurship need to be embedded into the university experience; but it is not for everyone and it is not a panacea for all economic problems. Students must be given options and provided with the most diverse pathways to success.
University must concentrate on producing really smart people and not get sidetracked into incubation.

- There is no innovation ecosystem, but there are very smart and entrepreneurial people, who have been attracted to the area by other smart people and the lifestyle, and who create the innovation.

2. **Strong Interactions With Industry Start With Strong Basic Research:**

- Stanford made it clear that its interactions with industry and entrepreneurship stemmed from its basic strength in research.
- Partnership development is integral to the success of research universities.
- Universities play an important role in promoting and stimulating regional economic development.
- Canada’s universities should do more to market and engage with the business side of higher education through more inclusive financial models and the participation of the university’s administration and finance people.
- Canadian universities face huge challenges to fully capitalize on the Bay Area’s potential.
- Canada needs to invest in its public universities; they are clearly struggling and their plight demonstrates the negative impacts of government failing to provide appropriate levels of funding.

3. **The Importance of the Need to Embrace Change, Disruption, and Failure:**

- Innovation is not a predictable process. One can design components, but should not try to over-determine the outcomes.
- Failure and innovation go hand in hand; there’s a fine line between risk and results.
• Silicon Valley cannot be easily duplicated, nor should Canada get fooled into trying.

• There are incredible opportunities for Canadian universities to engage in the economy of the Bay Area, both in terms of experiential learning opportunities for students, career opportunities for graduates, and learning from the university–commerce relationships that exist there.

**Conclusion**

This report has summarized the findings from the Quality Network for University’s five-day study tour to San Francisco and the Bay Area. Canada and its university sector have the opportunity to learn from California’s higher education sector and from Silicon Valley, particularly in the areas of PSE governance, teaching and learning, innovation, and commercialization.

It is necessary to build strong relationships with industry, and technology transfer offices can assist in this. To build an environment that facilitates innovation in academia, however, the California example makes it clear that entrepreneurship must be embedded in the university experience. For this to happen, post-secondary institutions need to produce strong research, while building and maintaining partnerships with industry.

Like entrepreneurs, PSE institutions must embrace a culture of failure as an avenue to success. Innovation is not a predictable process. Silicon Valley is a prime example of a community that cultivates and thrives on innovation and collaboration. It is an ecosystem for Canada to aspire to re-create, though duplicating it will not be easy.

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APPENDIX A

Bibliography


APPENDIX B

Meeting Program

International Site Visit: San Francisco and Bay Area

February 22–26, 2016

Objectives:

• To provide Canadian university leaders with an overview of current higher education challenges, opportunities, and best practices in the State of California and determine what Canadian universities can learn, leverage, and adopt.

• To explore the role of business–education relationships, internationalization, innovation, commercialization, and the student experience.

• To learn about the existing Canadian innovation ecosystem in the region and help Canadian university leaders respond to the research and innovation challenges facing Canada.

Day 1—February 22
Arrival—The Scarlet Huntington Hotel, 1075 California Street, CA 94108

7:30–9:30 p.m.—Informal Pre-Program Dinner
The Big 4, Central Pacific Room, Scarlet Huntington Hotel

Welcome and Program Overview

Dr. Michael Bloom, Vice-President, Industry Business Strategy
Dr. Matthew McKean, Senior Research Associate and Manager, Quality Network for Universities
MacKenzie Thorne, Research and Program Coordinator
Day 2—February 23
University of California, Berkeley

6:30–7:45 a.m.—Breakfast at hotel

7:50—Meet in hotel lobby for 8:00 departure to the University of California, Berkeley

8:45—Arrive at Stephens Hall, Room 442

9:00–9:15—Welcome to UC Berkeley
Dr. Andrew Szeri, Vice Provost, Strategic Academic and Facilities Planning, Operational Excellence Program Faculty Head, Professor, Mechanical Engineering

9:15–9:30—Introduction to Canadian Studies: Discussion of the pre-eminent U.S.-based program that supports research, teaching, and public programming that deepens the understanding of Canada and Canada–U.S. relations
Dr. Irene Bloemraad, Professor of Sociology and the Thomas Garden Barnes Chair of Canadian Studies

9:30–10:30—UC System Overview: Discussion of University of California Berkeley governance structure and current issues
Dr. Ellen Switkes, Senior Associate (formerly Vice President, Academic Advancement, Office of the President), Center for Studies in Higher Education (CSHE); Co-organizer of CSHE’s Berkeley Institutes on Higher Education (BIHE)

10:30–11:00—Berkeley Global Campus: Discussion of Berkeley’s transformational model for the international expansion of educational and research activities
Dr. Nils Gilman, Associate Chancellor/Chief of Staff

11:00–11:45—Q&A and further discussion of U.S. higher education with a focus on managing during financially challenging times

12:00 p.m.—Lunch: The Faculty Club at UC Berkeley, Great Hall
1:00–2:00—Lawrence Berkeley National Lab (LBNL) Info Session and Brief Campus Tour

Dr. Elsie Quaite-Randall, Chief Technology Transfer Officer, LBNL, will offer insight into how the large federally funded research labs interact with universities to advance their research mandate.

2:00—Depart Stephens Hall for Johnson & Johnson Labs

2:50—Arrive at Johnson & Johnson Labs (J&J Innovation Centre)

329 Oyster Point Boulevard, 3rd Floor, South San Francisco, CA 94080

About: “Supporting emerging pharmaceutical, medical device, consumer, and digital health companies through the tenuous time between early discovery and having the necessary resources to move a product through the path to commercialization.”

Dr. Stephanie Robertson, Director, New Ventures and James Viola, Marketing and Events Lead, will lead a tour of J&J Labs and describe how they interface with university partners, including their new partnership with the Canadian accelerator program for biotech start-ups.

5:00—Depart J&J for hotel

6:00—Arrive at hotel/dinner (by own arrangements)

Day 3—February 24

Stanford University

6:30–8:00 a.m.—Breakfast at hotel

8:15—Meet in hotel lobby for 8:30 departure to Consulate General of Canada in San Francisco (Palo Alto Office)

8:45–8:50—Bus arrives; delegates disembark, enter 580 California Street, and arrive at the Canada Room

9:00—Welcome Remarks: Brandon Lee, Canadian Consul General

Introduction of speakers and panellists: Dr. Matthew McKean, The Conference Board of Canada

9:05—Canadian Innovation Overview

Presentation about why Silicon Valley is important; how international governments engage with the region; how and why Canada engages with the region

Brandon Lee, Consul General of Canada, and David Stewart, researcher and consultant with a focus on Canada–U.S. education and innovation initiatives.
9:15—Canadian Innovation Panel

Overview of Canada's innovation activity in Silicon Valley, with emphasis on how Canadian universities engage with their missions and mandates. Panel with Canadian stakeholders in the region, including the Consul General of Canada, Brandon Lee; Digital Moose Lounge board members; and provincial government representatives in the region.

9:45—Q&A with the Canadian Innovation Panel

10:00–10:15—Wrap-up, networking opportunity, coffee and snack break

10:20–10:25—Depart for RocketSpace (by foot)

10:30–11:45—RocketSpace Accelerator
180 Sansome Street, San Francisco, CA 94104

About: “The ultimate technology campus in San Francisco exclusively designed to help entrepreneurs, start-ups, and corporate innovation professionals bring the future to market.”

Duncan Logan, Founder and CEO, will discuss how RocketSpace works with industry and other partners to drive innovation. Q&A to follow.

11:45—Depart for Stanford University

12:30 p.m.—Lunch: Stanford Graduate School of Business and Brief Campus Tour

1:55–2:00—Arrive at Bechtel International Centre, Assembly Room, Stanford University

2:05—Welcome, Afternoon Overview, Speaker Introduction, Dr. Matthew McKean, The Conference Board of Canada

2:10–2:35—Stanford University’s Economic Impact via Innovation and Entrepreneurship

Dr. Bill Miller, Herbert Hoover Professor of Public and Private Management Emeritus; Professor of Computer Science Emeritus and former Provost, Stanford University and Faculty Co-Director, SPRIE, will provide an overview of Silicon Valley’s “secret sauce” for innovation; Stanford’s unique/key role in the Silicon Valley ecosystem; and thoughts and best practices for university–industry relations drawn from the Stanford experience. Q&A to follow.

2:35–2:50—Coffee and snack break
2:50–3:35—Stanford Canadians Club Speed Panels

An opportunity to sit down in an informal setting with Canadian faculty and graduate students at Stanford University to gain their perspectives on the faculty and student experience at Stanford compared with that Canada; perspectives on Silicon Valley and innovation. Q&A to follow.

Panel #1 Intro and Moderator: Dr. Matthew McKean, The Conference Board of Canada; Panel #2 Intro and Moderator: Dr. Valerie Walker, Mitacs

3:35–3:45—Wrap-up, networking, coffee and snacks

3:45—Depart for IDEO, Palo Alto Office

4:00—Arrive at IDEO (150 Forest Avenue, Palo Alto, CA 94301)

About: “IDEO is a global design firm that takes a human-centred, design-based approach to helping organizations in the public and private sectors innovate and grow.”

Kenzie Haygood, Business Development, IDEO, will provide a tour and informal discussion about design thinking, the history of IDEO, and how it is thinking about universities and re-imagining classrooms. Q&A to follow.

6:00—Dinner: Terun (in Palo Alto)
448 South California Avenue, CA 94306

8:30—Depart restaurant for hotel

Day 4—February 25

Napa Valley
6:30–8:45 a.m.—Breakfast at hotel

9:00—Meet in hotel lobby for 9:15 departure to UC Davis Campus

11:00—University of California, Davis

About: “iAMSTEM Hub at UC Davis is a university-wide STEM education effort working across relevant disciplines to improve undergraduate STEM student success by catalyzing cultural change; fostering innovation in instruction, assessment, curriculum, and experiences; and building and sharing analytic tools to measure and inform student performance and teaching outcomes.”

Dr. Marco Molinaro, Assistant Vice Provost for Undergraduate Education and iAMSTEM Hub Director
Dr. Chris Pagliarulo, Associate Director of Assessment and Instruction, iAMSTEM, Office of Undergraduate Education

Tour and discussion of data visualization tools that support the university’s teaching improvement efforts; the project is part of the Bay View Alliance collaborative, a U.S.–Canada teaching improvement research project. Q&A to follow.

12:00 p.m.—Lunch: Catered lunch at the UC Davis lab

1:00—Depart UC Davis for Napa Valley

2:15—Arrive at Southern Napa/meet Verve guide/Champagne Sabrage

3:15—Arrive at Bell Winery for a tour and tasting

About: “Bell Wine Cellars is a small family-owned winery in Yountville, California dedicated to producing hand-crafted Napa Valley wines.”

5:00—Arrive at Miner Winery for a tour, reception, and experiential dinner in the wine cave

About: “Miner Family Wines is located in the heart of Napa Valley along the scenic Silverado Trail.”

8:00—Depart Miner

9:30—Arrive at the hotel in San Francisco

Day 5—February 26

Silicon Valley

6:30–8:45 a.m.—Breakfast at hotel

8:15—Meet in hotel lobby by 8:30 for departure to a series of visits in San Francisco and the Silicon Valley peninsula

9:00—Wiki-Ed Foundation, Presidio Office
11A Funston Avenue, San Francisco, CA 94129

About: “The Wiki Education Foundation connects higher education resources in the USA and Canada to the publishing power of Wikipedia. We cultivate learning that enriches Wikipedia and universities, creating a world where any learner can contribute to open scholarship and education for all. We change the lives of students by helping students change the world.”

Frank Schulenburg, Executive Director; Tanya Garcia, Director of Programs; Jami
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Matthewson, Educational Partnerships Manager, will provide an overview of the Wiki Ed Foundation's university-related teaching and learning mandate, with reference to WikiPedia page-creating as a teaching improvement tool. Q&A to follow.

10:30—Depart San Francisco for Mountain View (1 hour)

11:45—Lunch: Cucina Venti (Mountain View)
1390 Pear Avenue, Mountain View, CA 94043

12:45 p.m.—Google Advanced Technologies and Projects (ATAP)

About: “ATAP's innovation strategy is characterized by ambitious goals, a sense of urgency, and agile project teams that bring together partners and talent from around the world.”

Cameron Walker, Director of Google ATAP, will discuss Google’s applied research labs that interface with university partners and provide insight into how companies like Google approach university partnerships.

2:30–4:00—Singularity University (SU)
Building 20 S. Akron Road, Moffett Field, CA 94035

About: “Singularity University is a benefit corporation that provides educational programs, innovative partnerships and a startup accelerator to help individuals, businesses, institutions, investors, NGOs, and governments understand cutting-edge technologies, and how to utilize these technologies to positively impact billions of people.”

Katherine Myronuk, Founding Member, Synthesis & Convergence; Finance & Economics Chair Emeritus, will lead a tour of SU’s iLab and a presentation about SU research on the value of cross-disciplinary work in innovation. Q&A to follow.

4:15—Computer History Museum
1401 North Shoreline Boulevard, Mountain View, CA 94043

About: “The Museum is dedicated to the preservation and celebration of computer history and is home to the largest international collection of computing artifacts in the world, encompassing computer hardware, software, documentation, ephemera, photographs, oral histories, and moving images.”

Dag Spicer, Senior Curator, will provide a short guided tour. Q&A to follow and free time to roam

5:30—Depart to dinner at The Slanted Door restaurant

6:45—Arrive at Embarcadero Drive
7:45—Closing Dinner at The Slanted Door Restaurant
1 Vallejo—San Francisco Ferry Building #3, San Francisco, CA 94111
10:30—Meeting adjourned. Depart restaurant for hotel
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