Five-Year Academic Strategic Plan 2016-2021 - DRAFT

VISION/VALUES/BELIEFS

‘Through leading edge research and education, we integrate chemistry, biology and engineering to drive solutions to global challenges in energy, the environment and health’

Values
• Ethics, values and integrity of students
• Education, student future well-being in vocation
• Collegiality, collaboration & community
• Benefit to society, sustainability, meaningful problems, global impact
• Adaptive to rapidly changing world / global issues
• Creativity, imagination, open-mindedness
• Technical excellence & international reputation

Beliefs
• Worried on unsustainable track
• We will be among the top chem eng depts, and will be recognized as such
• Type of offering will attract corresponding type of students
• Rate of change in world is accelerating
• Strong link between “big” global issues and sustainability in chemical engineering discipline

ENVIRONMENT

Opportunities
• Shifting focus of government funding for industrial research
• Declining research group in companies and government
• Large-scale funding initiatives in Canada and internationally (Genome Canada, IC-IMPACTS, Gates)
• Dean’s Strategic Fund
• Non-traditional funding sources: industrial contributions, philanthropy
• Sustainability of planet (climate change, pollution, social unrest, water distribution and scarcity)
• Students adapt to changing workplace
• Large urban metropolitan environment
• Scale of U of T
• Centre for Innovation and Engineering Entrepreneurship
• Leveraging international reputation for collaborations
• Leveraging intl’ reputation for student recr.
• Online learning tools and resources
• E-textbooks/Cloud/open access for R&D data
• Changing accreditation approach

Threats
• Government Funding model (bums in seats)
• Declining/flat government funding (research + edu)
• Declining international student funding
• U of T Funding model (passed down)
• Unstable & unpredictable research funding
• Funding (MTCU) based on headcount with base costs
• Faculty workload – fragmented, too many different tasks
• Efficiency of teaching resource considering attendance
• Limit resources for transformation to “work on the floor”

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ORGANIZATION

Structure
• 1 Chair
• 3 Associate Chair – UG/Grad/Research
• 17 Admin Staff – optimize with transformation
• Leadership Team
• 13 Committees & 7 Task Forces
• Staff have very defined roles
• 6 Research Clusters for collaboration
• 5 Institutes: (3 with Exec Dir – Business Dev)
• BioZone, OCCAM, SOCAAR, IWI, P&PC
• Central with low team integration
• Low authority / high autonomy for prof
• Self-organizing system with tenure security

Style
• Faculty champions drive key initiatives
• Flexible, adaptable community
• Collegial with low team integration
• E-learning technology very limited

Size (Capacity)
• First year intake ~90 domestic, 40 int’l
• Second year intake ~150
• Graduate students 240, ~8 students/FTE
• Focus on TCC improvements in grad

Staffing
• 34 Professors
• 19 Adjunct Professors
• Not anticipating sign change in Faculty size (+10%?)

External Relations With Industry
• Mediated through institutes & centres
• $1M industrial funding
• 46 invention disclosures; 7 licenses
• ~70 Company relationships
• 20 Companies Formed since 1970=12yr

Transformational Resources (New)
• Support for faculty champions
• Educational Design Advisor (EDA)
• Faculty of Education Masters/PhD Students
• Board of Advisors focus on business development
• Develop Exec. Dir. role to drive business growth with industry
• Teaching technology & big data resources
## Five-Year Academic Strategic Plan – Key Initiatives, 2016-2021 (DRAFT)

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<td>1</td>
<td>Initiate large multi-researcher / multi-disciplinary (MR/MD) collaborative programs around our vision</td>
<td><strong>By 2020 – 3 new MR/MD programs are running</strong>&lt;br&gt;&lt;br&gt;A. 2016 Identify potential target issues&lt;br&gt;B. 2017 Establish funding and approvals&lt;br&gt;C. 2018 First Multi Researcher / Multi Disc program is formally launched&lt;br&gt;D. 2019 Program 2&lt;br&gt;E. 2020 Program 3</td>
<td>i. Broad solicitation of problem identification candidates&lt;br&gt;ii. Kickstarter initiatives + Dean’s Strategic Fund seed projects&lt;br&gt;iii. Start more seeds with risk that some will fail&lt;br&gt;iv. Engage industrial partners&lt;br&gt;v. External advisory board&lt;br&gt;vi. Hire 3 new faculty aligned with the plan&lt;br&gt;vii. Identify key funding sources attached to big themes</td>
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<td>2</td>
<td>Create a modern chemical engineering curriculum aligned with our vision</td>
<td><strong>By 2020 reduce in-classroom instructional time significantly (~30%), complementing with problem-based and experiential learning in ways that improve learning outcomes</strong>&lt;br&gt;&lt;br&gt;A. 2016 Foundation with grad students&lt;br&gt;B. 2016 Lab Task Force integrating Labs/curriculum&lt;br&gt;C. 2016 E-modules for Engineering Economics&lt;br&gt;D. 2017 Enhanced professional skills program &amp; international program&lt;br&gt;E. 2018 Graduate hatchery&lt;br&gt;F. 2019 – 30% reduction in classroom time&lt;br&gt;G. 2020 – 50% achieved</td>
<td>i. Benchmark (e.g., MIT &amp; Stanford &amp; others)&lt;br&gt;ii. Add Educational Design Advisor + Fac of Ed help&lt;br&gt;iii. Define roadmap to 50% in detail&lt;br&gt;iv. Unit operations renewal – Integrated Chemical Engineering&lt;br&gt;v. Seed pilot designs in selected safe places in the existing curriculum&lt;br&gt;vi. New mandatory course for grads in Graduate Research Methods&lt;br&gt;vii. Develop MOOC pilot with Dean’s Strategic Fund&lt;br&gt;viii. Hire the faculty who can deliver new program</td>
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<td>3</td>
<td>Elevate teaching excellence, effectiveness and impact</td>
<td><strong>By 2020 the student-centred, diverse-style learning environment is a distinguishing trait of the whole program</strong>&lt;br&gt;&lt;br&gt;A. 2016 Teaching triads kick-off&lt;br&gt;B. 2017 Budget includes new resources&lt;br&gt;C. 2018 Measurable impact expected in student response&lt;br&gt;D. 2020 No doubt in transformation on feedback</td>
<td>i. Teaching stream appointment (s)&lt;br&gt;ii. Teaching effectiveness committee&lt;br&gt;iii. Initiate teaching triads for mutual support&lt;br&gt;iv. Coordinate with new curriculum above&lt;br&gt;v. One faculty with strong teaching improvement focus</td>
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<td>4</td>
<td>Catalyze the synergy of our external networks with our internal capability for societal and economic impact</td>
<td><strong>By 2020 increase R&amp;D funding to $30M</strong>&lt;br&gt;&lt;br&gt;A. 2016 Lab Task Force integrating Labs/curriculum&lt;br&gt;B. 2016 Launch Graduway to engage alumni&lt;br&gt;C. 2017 Research theme alignment plan&lt;br&gt;D. 2020 – 1,000 engaged alumni &amp; 100 engaged industrial partners</td>
<td>i. Benchmark to ID best practice&lt;br&gt;ii. Strong design support from Board of Advisors&lt;br&gt;iii. Priority focus areas determined with initiative 1&lt;br&gt;iv. Catalogue and critique current situation – external links&lt;br&gt;v. Institute Exec Dir help design effective approaches&lt;br&gt;vi. Identify climate change related big themes &amp; funding&lt;br&gt;vii. Enhance tracking and engagement with alumni and customers</td>
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<td>5</td>
<td>Reorganize and streamline administration and support systems efficiency to drive overall space and organizational effectiveness</td>
<td><strong>By 2020 we have realized the above bold plans because we purposefully allocated the resource to do it!</strong>&lt;br&gt;&lt;br&gt;A. 2016 Organizational design and funding freed up&lt;br&gt;B. 2017 4-year facility plan reflecting above&lt;br&gt;C. 2017 Resources in place and actively working&lt;br&gt;D. 2017 New space concept is in place&lt;br&gt;E. 2018 TTC model saves resources</td>
<td>i. Streamline administrative work and allocate to new transformation resources&lt;br&gt;ii. Shared services model across the Dept/Faculty&lt;br&gt;iii. Space management committee/policy&lt;br&gt;iv. Re-conceptualize learning space design per above&lt;br&gt;v. Lose the walls and see industry partners and the whole university as learning space</td>
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