# SoCS Graduate Updates

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# Goal of today's update

- Share information on OGPS's proposed **4+1** and **Accelerated Master's** frameworks
- Show examples of **4+1** and **Accelerated** pathways for MSc.CS programs
  - Get feedback on proposed pathways
  - Share identified issues and potentially identify more from Council input
- Determine level of interest from Council for **4+1** / **Accelerated Master's** pathways for MSc.CS programs

# Accelerated Master's update

- OGPS has proposed **4+1** and **Accelerated Master's** frameworks to enable shorter Master's pathways to our own undergraduate students across campus
  - **4+1 framework** builds on existing degrees (no change to degree requirements)
  - **Accelerated Master's** introduces efficiencies through "reduced" graduate course requirements
    - solves the "double counting" by counting in ugrad degree, and "waiving" courses in grad program if taken in ugrad

- Each unit asked to consider suitable pathways for their discipline and program structures

# Rationale and example pathways from OGPS

## Why 4+1 / Accelerated Master's programs?

- Recognition (and retention) of **exceptional undergraduate students** and provision of enhanced and accelerated course of study for them
- Presentation of the option of graduate studies to deserving students who otherwise might not have considered it
- Relatively seamless transition to graduate-level work
- Facilitation of timely and early completion of the Master's degree
- Help recruit domestic enrolments

# Normal Pathway from Bachelor's to Master's

| Bachelor's | | | | | | Master's | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year 3 | | | Year 4 | | | Year 1 | | | Year 2 | | |
| Fall | Winter | Summer | Fall | Winter | Summer | Fall | Winter | Summer | Fall | Winter | Summer |
| | | | Apply to master's program | Accepted to master's program | Graduate from Bachelor's (no work toward master's) | Begin graduate studies | | Begin thesis research (if applicable) | | | Defend thesis (if applicable) |

- Summer semester between Bachelor's and Master's off.
- Two full years of master's registration (and funding).

# What is possible right now with existing degrees… “4+1” framework

<table>
<tr><th colspan="5">Bachelor’s</th><th colspan="6">Master’s</th></tr>
<tr><th colspan="3">Year 3</th><th colspan="2">Year 4</th><th></th><th colspan="3">Year 1</th><th colspan="3">Year 2</th></tr>
<tr><th>Fall</th><th>Winter</th><th>Summer</th><th>Fall</th><th>Winter</th><th>Summer</th><th>Fall</th><th>Winter</th><th>Summer</th><th>Fall</th><th>Winter</th><th>Summer</th></tr>
<tr><td colspan="3" rowspan="2">Promote 4+1 to senior undergraduate students</td><td>Apply to master’s program</td><td>Accepted to master’s program</td><td rowspan="2">Graduate from Bachelor’s. Register as graduate student and begin thesis research.</td><td colspan="2" rowspan="2">Complete remaining graduate program requirements (minimum 1.50 credits for thesis-based and 3.50 credits for course-based)</td><td rowspan="2">Defend thesis (if applicable)</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td colspan="2">Students complete 1-2 graduate courses</td></tr>
</table>

- Sign 4th year students into 1-2 graduate courses, to be completed as undergraduate program electives.
  - Ideally, research methods or other introductory graduate courses.
- Model is ideal for thesis-based programs, where students can begin thesis research during the summer.
- Students still required to complete minimum degree requirements while registered as graduate student.

# Example for 4+1 in Engineering (thesis-based): BEng + MASc in Engineering

<table>
<tr><th colspan="5">Bachelor's</th><th colspan="4">MASc in Engineering</th></tr>
<tr><td colspan="3">Year 3</td><td colspan="2">Year 4</td><td></td><td colspan="3">Year 1</td></tr>
<tr><td>Fall</td><td>Winter</td><td>Summer</td><td>Fall</td><td>Winter</td><td>Summer</td><td>Fall</td><td>Winter</td><td>Summer</td></tr>
<tr><td colspan="3" rowspan="2">Promote 4+1 to senior undergraduate students</td><td>Apply to master's program</td><td>Accepted to master's program</td><td rowspan="2">Graduate from Bachelor's. Register as graduate student and begin thesis research.</td><td colspan="2" rowspan="2">3 graduate electives [1.50 credits]<br>Complete thesis</td><td rowspan="2">Defend thesis</td></tr>
<tr><td>1 ENGG graduate course [0.50]</td><td>1 ENGG graduate course [0.50]</td></tr>
</table>

- MASc in Engineering requires completion of 2.00 graduate credits and a thesis.
- Students able to complete early, and are required to complete one additional graduate course to meet degree requirements as graduate student.

# Example for 4+1 in Comp Sci (thesis-based): BComp + MSc.CS

| Bachelor's Year 3 | | Bachelor's Year 4 | | | Master's Year 1 | | | |
|---|---|---|---|---|---|---|---|---|
| Fall | Winter | Summer | Fall | Winter | Summer | Fall | Winter | Summer |
| **B.COMP (CS or Seng)** | | | | | **MSc Computer Science** (thesis-based) | | | |
| Promote 4+1 to senior undergrad students | | | Apply to 4+1 Master's Program | Accepted to 4+1 Master's Program | Graduate from Bachelor's + Register as a grad student + Start thesis research | Continue thesis research | Complete thesis | Defend thesis |
| | | | CIS*4900 Computer Science Project [0.5] | CIS*6890 Technical Communications & Research Methodology [0.5] | 1 Graduate Course Elective [0.5] | 3 Graduate Course Electives [1.5] | | |

- MSc in Computer Science by thesis requires completion of CIS*6890, 4 graduate electives [total 2.5 credits], and a thesis.
- Students able complete early without having to complete additional graduate coursework.

# Proposed new Accelerated Master's framework – would need Senate approval

<table>
<tr><th colspan="5">Bachelor's</th><th colspan="6">Master's</th></tr>
<tr><th colspan="3">Year 3</th><th colspan="2">Year 4</th><th></th><th colspan="3">Year 1</th><th colspan="3">Year 2</th></tr>
<tr><th>Fall</th><th>Winter</th><th>Summer</th><th>Fall</th><th>Winter</th><th>Summer</th><th>Fall</th><th>Winter</th><th>Summer</th><th>Fall</th><th>Winter</th><th>Summer</th></tr>
<tr><td colspan="3" rowspan="2">Promote 4+1 to senior undergraduate students</td><td>Apply to master's program</td><td>Accepted to master's program</td><td rowspan="2">Graduate from Bachelor's. Register as graduate student and begin thesis research.</td><td colspan="2" rowspan="2">Complete remaining graduate program requirements</td><td rowspan="2">Defend thesis (if applicable)</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td colspan="2">Students complete 1-2 graduate courses</td></tr>
</table>

- Based on evidence of Learning Outcomes achievement, we "double count" graduate courses (up to 1.00 credits) completed as senior undergraduate toward meeting master's requirements.
- Students would not be required to meet minimum degree requirements while registered as graduate student.
- Would require Senate approval.

# Example 1 for Accelerated Master's in Comp Sci: BComp + MSc.CS (w/ 4900)

<table>
<tr><th colspan="2">Bachelor's Year 3</th><th colspan="3">Bachelor's Year 4</th><th colspan="4">Master's Year 1</th></tr>
<tr><th>Fall</th><th>Winter</th><th>Summer</th><th>Fall</th><th>Winter</th><th>Summer</th><th>Fall</th><th>Winter</th><th>Summer</th></tr>
<tr><td colspan="5">B.COMP (CS or Seng)</td><td colspan="4">MSc Computer Science (thesis-based)</td></tr>
<tr><td colspan="3" rowspan="2">Promote 4+1 to senior undergrad students</td><td>Apply to 4+1 Master's Program</td><td>Accepted to 4+1 Master's Program</td><td>Graduate from Bachelor's + Register as a grad student + Start thesis research</td><td>Continue thesis research</td><td>Complete thesis</td><td rowspan="2">Defend thesis</td></tr>
<tr><td>CIS*4900 Computer Science Project [0.5]</td><td>CIS*6890 Technical Communications & Research Methodology [0.5]</td><td>1 Graduate Course Elective [0.5]</td><td colspan="3">2 Graduate Course Electives [1.0]</td></tr>
</table>

- MSc in Computer Science by thesis requires completion of CIS*6890, 4 graduate electives [total 2.5 credits], and a thesis.
- In "Accelerated" Master's, students would get credit for up to two (2) 0.5 credit graduate-level courses taken in ugrad towards their degree. Since we allow 1 4000-level ugrad in our MSc course, CIS*4900 would count.
- Leaves 3 graduate course electives for Summer / Fall / Winter terms

# Example 2 for Accelerated Master's in Comp Sci: BComp + MSc.CS (w/o 4900)

<table>
<tr><th colspan="2">Bachelor's Year 3</th><th colspan="3">Bachelor's Year 4</th><th colspan="4">Master's Year 1</th></tr>
<tr><th>Fall</th><th>Winter</th><th>Summer</th><th>Fall</th><th>Winter</th><th>Summer</th><th>Fall</th><th>Winter</th><th>Summer</th></tr>
<tr><td colspan="5">B.COMP (CS or Seng)</td><td colspan="4">MSc Computer Science (thesis-based)</td></tr>
<tr><td colspan="3" rowspan="2">Promote 4+1 to senior undergrad students</td><td>Apply to 4+1 Master's Program</td><td>Accepted to 4+1 Master's Program</td><td>Graduate from Bachelor's + Register as a grad student + Start thesis research</td><td>Continue thesis research</td><td>Complete thesis</td><td rowspan="2">Defend thesis</td></tr>
<tr><td>1 Graduate Course Elective [0.5]</td><td>CIS*6890 Technical Communications & Research Methodology [0.5]</td><td>1 Graduate Course Elective [0.5]</td><td colspan="3">2 Graduate Course Electives [1.0]</td></tr>
</table>

- MSc in Computer Science by thesis requires completion of CIS*6890, 4 graduate electives [total 2.5 credits], and a thesis.
- In "Accelerated" Master's, students would get credit for up to two (2) 0.5 credit graduate-level courses taken in ugrad towards their degree. Since we allow 1 4000-level ugrad in our MSc course, CIS*4900 would count.
- Leaves 3 graduate course electives for Summer / Fall / Winter terms

# Example 3 for Accelerated Master's in Comp Sci: BComp + MSc.CS (no course in summer)

<table>
<tr><th colspan="2">Bachelor's Year 3</th><th colspan="3">Bachelor's Year 4</th><th colspan="4">Master's Year 1</th></tr>
<tr><th>Fall</th><th>Winter</th><th>Summer</th><th>Fall</th><th>Winter</th><th>Summer</th><th>Fall</th><th>Winter</th><th>Summer</th></tr>
<tr><td colspan="5">B.COMP (CS or Seng)</td><td colspan="4">MSc Computer Science (thesis-based)</td></tr>
<tr><td colspan="3" rowspan="2">Promote 4+1 to senior undergrad students</td><td>Apply to 4+1 Master's Program</td><td>Accepted to 4+1 Master's Program</td><td rowspan="2">Graduate from Bachelor's + Register as a grad student + Start thesis research</td><td>Continue thesis research</td><td>Complete thesis</td><td rowspan="2">Defend thesis</td></tr>
<tr><td>CIS*4900 Computer Science Project [0.5]</td><td>CIS*6890 Technical Communications & Research Methodology [0.5]</td><td colspan="2">3 Graduate Course Electives [1.5]</td></tr>
</table>

- MSc in Computer Science by thesis requires completion of CIS*6890, 4 graduate electives [total 2.5 credits], and a thesis.
- In "Accelerated" Master's, students would get credit for up to two (2) 0.5 credit graduate-level courses taken in ugrad towards their degree.
- Leaves 3 graduate course electives for Summer / Fall / Winter terms

# Challenges of 4+1 or Accelerated Master's for our Collaborative Specializations

Graduate Matters SoCS Council Update November 12, 2023

# Accelerated Master's for MSc.CS + CSAI

| Bachelor's Year 3 | | Bachelor's Year 4 | | | Master's Year 1 | | | | Master's Year 2 |
|---|---|---|---|---|---|---|---|---|---|
| Fall | Winter | Summer | Fall | Winter | Summer | Fall | Winter | Summer | Fall |
| B.COMP (CS or Seng) | | | | | MSc Computer Science with CSAI (thesis-based) | | | | |
| Promote 4+1 to senior undergrad students | | | Apply to 4+1 Master's Program | Accepted to 4+1 Master's Program | Graduate from Bachelor's + Register as a grad student + Start thesis research | Continue thesis research | Continue thesis research | Continue thesis research | Defend Thesis |
| | | | CIS*4900 Computer Science Project [0.5] | CIS*6890 Technical Communications & Research Methodology [0.5] | 1 Complementary AI Elective [0.5] | UNIV*6080 Computational Thinking for AI [0.5] + 1 AI Elective Core Course [0.5] + 1 Complementary AI-Related Elective [0.5] | | | UNIV*6090 AI & Society [0.5] |

- MSc in Computer Science by thesis (with collaborative specialization in AI) requires completion of CIS*6890, UNIV*6080, UNIV*6090, 1 AI elective core course, 2 complementary AI-related electives [total 2.75 credits], and a thesis.
- The CSAI is not able to accommodate the Accelerated Master's model, based on the current schedule of required AI courses.

# Accelerated Master's for MSc.CS + CSOneH

| Bachelor's Year 3 | | Bachelor's Year 4 | | | Master's Year 1 | | | | Master's Year 2 |
|---|---|---|---|---|---|---|---|---|---|
| Fall | Winter | Summer | Fall | Winter | Summer | Fall | Winter | Summer | Fall |
| B.COMP (CS or Seng) | | | | | MSc Computer Science with CSAI (thesis-based) | | | | |
| Promote 4+1 to senior undergrad students | | Apply to 4+1 Master's Program | Accepted to 4+1 Master's Program | | Graduate from Bachelor's + Register as a grad student + Start | Continue thesis research | Continue thesis research | Complete Thesis | Defend Thesis |
| | | CIS*4900 Computer Science Project [0.5] | CIS*6890 Technical Communications & Research Methodology [0.5] | | 1 Graduate Course Elective [0.5] | 1 Graduate Course Elective [0.5] | ONEH*6000 One Health Approaches to Research [0.5] | | ONEH*6100 Master's Seminar in One Health [0.5] |

- MSc in Computer Science by thesis (with collaborative specialization in OneHealth) requires completion of CIS*6890, ONEH*6000, ONEH*6100, 2 elective graduate courses [total 2.5 credits], and a thesis.
- The CS ONEH is not able to accommodate the Accelerated Master's model, based on the current schedule of required courses.

# College-level suggestions to ensure academic excellence and success

- Minimum A- average in bachelor's at the point of acceptance to the accelerated master's program
- Early identification of an advisor
- Limiting option to a small number of students

# Discussion

- Potential challenges / considerations?
  - Is it enough time for research in your area?
  - Are there potential barriers with shorter time frame?
    - e.g. obtaining ethics
- Interest?

# Questions?