



Have You Considered Graduate School?

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Why do an MSc or PhD?

- If you want to do research, you need an advanced degree, at least an MSc, but more likely a PhD.
- An MSc will improve your marketable skills (at only a small cost in time and money).
- You get to work on more things that interest you. You get to specialize in a particular area \Rightarrow Intellectual Satisfaction.
- Career-wise, with an MSc, you will make significantly more money!
- With a PhD, less so, but you will still be very financially comfortable.

Is There a Demand for Computer Science MSc's and PhD's?

- According to Computing Research Associates (CRA) the demand for CS graduates far exceeds the supply, the demand for Engineering graduates and the supply are more in balance while for the Biological Sciences the supply is much greater than the demand.
- Most popular first jobs in Computer Science (from Workopolis):

Position	Starting Salary
Software Developer	\$68,000
Web Developer	\$52,000
Business Analyst	\$74,000
Consultant	\$74,000
Software Engineer	\$80,000
Project Manager	\$75,000

- The average starting salaries for graduates from Computer Science programs is \$68,000.
- Among the best 15 Jobs (according to Fortune, salaries US dollars):
 - 3. Ph.D., Computer Science, Median Salary: \$147,400, Projected Growth in Jobs by 2024: 12%, Percentage Who Are Highly Satisfied: 77%, Low Stress: 45%
 - 6. Masters, Computer Science, Median Salary: \$125,700, Projected Growth in Jobs by 2024: 11.9%, Percentage Who Are Highly Satisfied: 69%, Low Stress: 51%
 - 10. Masters, Software Engineering, Median Salary: \$118,900, Projected Growth in Jobs by 2024: 11.9%, Percentage Who Are Highly Satisfied: 66%, Low Stress: 51%

What is the Demand by Specific Areas of Computer Science

- The US Bureau of Labor also collected data in various computer related fields. Total employment is now more 10% higher than at the height of the dot-com boom, even in the face of increased off-shoring (basic programming jobs).
- Demand for basic programmers has been significantly reduced but demand for other specialized areas has increased (sometimes, quite significantly).

Financial Support for Graduate Studies

- At UWO Computer Science graduate students are fully supported:

Canadian/Landed Immigrant MSc	\$30,097/16 months
International MSc	\$41,347/16 months
Canadian/Landed Immigrant PhD	\$24,198/year
International PhD	\$33,098/year

- Most North American and European universities offer similar support.
- At UWO, this money comes from the university, your supervisor and a TA position.
- At UWO, an MSc takes about 1.5 years to complete while a PhD takes 4 years beyond the MSc.

The Financial Case for MSc versus BSc

- Assumptions: BSc salary: \$75000, MSc salary: \$85000 or \$95000, no inflation, and 5% salary increase each year (these assumptions are conservative).
- Lets look at the cumulative salaries and their differences assuming a 2 year MSc (no salary) for a BSc and an MSc graduate.
- With an MSc, you can make more than \$1 million dollars over your working life than with a BSc!!!

Year	BSc Salary	Cum BSc Salary	MSc Salary	Cum MSc Salary	Cum Diff
1	75000.00	75000.00	85000.00	0.00	-75000.00
2	78750.00	153750.00	89250.00	0.00	-153750.00
3	82687.50	236437.50	93712.50	93712.50	-142725.00
4	86821.88	323259.38	98398.12	192110.62	-131148.75
5	91162.97	414422.34	103318.03	295428.66	-118993.69
6	95721.12	510143.47	108483.93	403912.59	-106230.88
7	100507.17	610650.62	113908.12	517820.72	-92829.91
8	105532.53	716183.12	119603.53	637424.25	-78758.88
9	110809.16	826992.25	125583.71	763007.94	-63984.31
10	116349.62	943341.88	131862.89	894870.81	-48471.06
15	148494.88	1618392.38	168294.17	1659927.75	41535.38
20	189521.28	2479946.75	214790.73	2636355.75	156409.00
25	241882.53	3579532.50	274133.47	3882553.00	303020.50
30	308710.25	4982914.00	349871.50	5473051.50	490137.50
35	394001.19	6774023.50	446534.53	7502975.50	728952.00
40	502856.44	9059984.00	569903.75	10093730.00	1033746.00
45	641786.31	11977512.00	727357.62	13400263.00	1422751.00
50	819100.06	15701100.00	928313.06	17620328.00	1919228.00

Cumulative BSc (starting \$75000) and MSc (starting \$85000) salaries and their differences.

Year	BSc Salary	Cum BSc Salary	MSc Salary	Cum MSc Salary	Cum Diff
1	75000.00	75000.00	95000.00	0.00	-75000.00
2	78750.00	153750.00	99750.00	0.00	-153750.00
3	82687.50	236437.50	104737.50	104737.50	-131700.00
4	86821.88	323259.38	109974.38	214711.88	-108547.50
5	91162.97	414422.34	115473.09	330184.97	-84237.38
6	95721.12	510143.47	121246.75	451431.72	-58711.75
7	100507.17	610650.62	127309.09	578740.81	-31909.81
8	105532.53	716183.12	133674.55	712415.38	-3767.75
9	110809.16	826992.25	140358.28	852773.62	25781.38
10	116349.62	943341.88	147376.20	1000149.81	56807.94
15	148494.88	1618392.38	188093.52	1855213.75	236821.38
20	189521.28	2479946.75	240060.28	2946515.75	466569.00
25	241882.53	3579532.50	306384.53	4339324.50	759792.00
30	308710.25	4982914.00	391032.91	6116941.00	1134027.00
35	394001.19	6774023.50	499068.09	8385680.00	1611656.50
40	502856.44	9059984.00	636951.38	11281230.00	2221246.00
45	641786.31	11977512.00	812929.31	14976766.00	2999254.00
50	819100.06	15701100.00	1037526.75	19693310.00	3992210.00

Cumulative BSc (starting \$75000) and MSc (starting \$95000) salaries and their differences.

Why do a PhD?

- A necessary qualification for a professorship or a research scientist with industry/government.
- Often, this person is the big cheese.
- Do research, expand the frontiers of knowledge, leave a mark behind.
- Do multidisciplinary research, for example: robot control for surgery, detect/predict earthquakes and severe weather events, etc.
- On average, a PhD can provide greater lifelong freedom of movement (your credentials are good anywhere) and more independence. Usually, lots of paid travel (conferences and collaborative research) is required.
- More focused on ideas and less on process, politics, or economics.
- Very comfortable financially.
- Get tremendous satisfaction in socially relevant activities.

Specifically for University Professors

- Immediate means to leverage ideas through graduate students.
- Variety: teach, research, write papers and grant applications, give talks, international travel, etc.
- Some pressure/stress, especially before tenure (publish or perish).
- Freedom to pursue your ideas (especially after tenure).
- Satisfaction in teaching, publications and impact of work.
- Relatively high job security and stability.
- Comfortable to very good salaries.
- Consulting is possible (for extra income).
- Lets look at salaries assuming \$75000 starting salary for a BSc and \$120000 salary for a PhD after 5 years of further study.

Year	BSc Salary	Cum BSc Salary	PhD Salary	Cum PhD Salary	Cum Diff
1	75000.00	75000.00	0.00	0.00	-75000.00
2	78750.00	153750.00	0.00	0.00	-153750.00
3	82687.50	236437.50	0.00	0.00	-236437.50
4	86821.88	323259.38	0.00	0.00	-323259.38
5	91162.97	414422.34	0.00	0.00	-414422.34
6	95721.12	510143.47	120000.00	120000.00	-390143.47
7	100507.17	610650.62	126000.00	246000.00	-364650.62
8	105532.53	716183.12	132300.00	378300.00	-337883.12
9	110809.16	826992.25	138915.00	517215.00	-309777.25
10	116349.62	943341.88	145860.75	663075.75	-280266.12
15	148494.88	1618392.38	186159.39	1509347.00	-109045.38
20	189521.28	2479946.75	237591.80	2589427.75	109481.00
25	241882.53	3579532.50	303234.03	3967914.75	388382.25
30	308710.25	4982914.00	387012.00	5727252.50	744338.50
35	394001.19	6774023.50	493936.28	7972662.00	1198638.50
40	502856.44	9059984.00	630401.75	10838438.00	1778454.00
45	641786.31	11977512.00	804570.06	14495974.00	2518462.00
50	819100.06	15701100.00	1026857.94	19164020.00	3462920.00

Cumulative BSc (starting \$75000) and PhD (starting \$120000) salaries and their differences.

- The financial payoff for BSc \Rightarrow PhD is not as good (percentage wise) as for a BSc \Rightarrow MSc, but the other things more than compensate for money (IMHO).
- Don't forget, these are conservative estimations. I ran my own starting salary with these assumptions and I make about \$30000 more than this program estimates I should have after 28 years of working!

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Questions?