making the most of your graduate training

session breakdown:
1. strategies for personal growth
2. strategies for career growth

introductions:
• jennifer gardy
  – ubc microbiology & immunology postdoc
  – occasional television host
• sasha fedorova
  – sfu computer science assistant professor
• and you!
  – name
  – department
  – where are you in your graduate program?

keys to success

the point of grad school is to become a scientist, not to stuff yourself full of facts
grad school is a personal experience

don’t be ordinary. be creative and have fun!

The point of grad school is to become a scientist, not to stuff yourself full of facts

“There is no one way to be a graduate student. Each of us is an individual - each of us has individual needs, goals, capacities and experiences. Advice that is productive for one student may be disastrous for another.”
- Raymond Huey

“Your goal as a graduate student is to become an expert in wielding the scientific method, and this can be achieved pursuing any project.”
- Zdenko Tuma

“The creation of something new is not accomplished by the intellect but by the play instinct acting from inner necessity... The creative mind plays with the objects it loves.”
- Carl Jung
key scientist skills
• teaching yourself a new subject
• developing hypotheses/insights
• collaborating with others
• communicating your results

grad school is a personal experience

in teaching yourself a new subject, remember that…

recognize how you learn. embrace it.

“Whatever you are by nature, keep to it. Be what nature intended for you and you will succeed.”
- Sydney Smith

multiple intelligences survey
multiple intelligences (Gardner, 1983)
- 8 intelligences as defined by certain criteria:
  - can be isolated (e.g. brain damage, autism)
  - displays a growth pattern
  - has core operation & symbol system
- each person has a unique “cognitive profile”
- different intelligences learn in different ways
- activities appropriate for one intelligence may not work for all

example from Gardner

<table>
<thead>
<tr>
<th>linguistic</th>
<th>musical</th>
<th>logical</th>
</tr>
</thead>
<tbody>
<tr>
<td>story</td>
<td>song</td>
<td>mapping</td>
</tr>
<tr>
<td>naturalist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>collections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>visual</td>
<td>artwork</td>
<td></td>
</tr>
<tr>
<td>intrapersonal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>diaries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>interpersonal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>relationships</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bodily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>role-play</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

survey results

what are your top 3 intelligences?

teaching yourself: finding information
- find & read papers, other reports:
  - literature searches, scanning abstracts and intros from key journals, subscribe to eTOCs, lab archives, previous students’ theses
  - lab web pages (intro page, old presentations), conference websites’ abstract listings, animations/graphics
- interact with your scientific peers
  - brainstorming with a supervisor, discussion groups, Facebook

linguistic naturalist logical visual interpersonal

teaching yourself: learning key info
- translate key facts into a form that works for you
  - sentence, mnemonic, map, formula, drawing, etc…
- develop your own fact filing/storage system
  - binders of important papers
  - Connotea – online paper organization tool
  - bookmarks for useful sites/software
  - notebook with your own selected facts
- test yourself, review notes when needed

linguistic musical logical visual

in developing insights…

don’t be ordinary.
be creative, have fun!
old dogs can learn new tricks
- take mental health breaks to generate seeds (and stay sane!)
- plant seeds, water them with exposure to different people and environments
- play with your ideas – don’t limit yourself with practicality or disciplinary boundaries
- don’t be afraid of failure

tips for collaborating
- see your supervisor first
  - they know who’s doing what within and outside lab
  - are aware of legal/political issues
  - best person to set up first meetings
- browse department web pages for people
- learn to speak their language
- maintain an equal relationship
  - meetings, papers, authorship

communication…

you should be able to explain your project to a 10th grader in 10-20 seconds/1-2 sentences

communication litmus test

if you can’t communicate your work, you’re toast.

new perspectives, new ideas, new techniques, new connections.

saves time & sanity. makes better science.

When creative insights do occur…
...they frequently happen when the mind is not consciously focused on the problem.

"...they frequently happen when the mind is not consciously focused on the problem.”
I use computer science techniques to draw maps of the relationships between the genes and proteins of the human immune system. My coworkers and I use those maps to understand immunity and look for the best genes or proteins to target with new drugs to treat infection.

**Challenge!**

Find me later and tell me your 10-second research synopsis!

---

**Brevity is the sole of wit**

- Have a central message and keep it at about that level
- Broad audience (e.g. conference, seminar to a different department) = keep the whole talk at about that level
- Focused audience (e.g. journal club) = a bit more detail, but a basic central thesis

People will only remember one thing from a science talk.

---

**An Unfortunate Example**

- I wish I was making this up, but I was a talk once where the slides looked exactly like this.
- The text was tiny too small, and it was all centered together in the middle of the screen, even the headline.
- To make matters worse, it was a math talk and was full of tiny little equations.
- And, just as I am doing right now, the presenter read every sentence, word for word, off the screen.
- Which brings me to my next point. I find because it’s readable doesn’t mean you should read it.

---

**TV Wisdom**

Say a duck, show a duck.
RNA isolated from the brain of nontransgenic (+/+), heterozygous GFAP-IL6 (+/tg), or homozygous (tg/tg) GFAP-IL6 transgenic mice. While cerebral expression of the ICAM-1, Mac-1, EB22/5.3, and GFAP genes was increased in GFAP-IL6 mice, quantitative analysis revealed a marked difference in the levels of expression of the Mac-1 and EB22/5.3 genes between heterozygous and homozygous GFAP-IL6 mice at 3 months but not at 12 months of age.

Difference in Mac-1 & EB22/5.3 expression between heterozygous and homozygous transgenics at 3mos. of age.

Difference is not present at 12mos. of age.

Avoid ‘are we there yet?’

Provide an outline

1. intro
2. results
3. discussion

Colour or font decoration makes key points stand out against the rest of the text
NDS/A

no damned symbols/acronyms

explain your topic to a guy at a bar

The receptor tyrosine kinase for NGF, \(gp140TrkA\) (where \(TrkA\) is a receptor tyrosine kinase for \(NGF\), a product of the \(trk\) oncogene) suppresses programmed cell death and activates the expression of the genes associated with neuronal differentiation by signalling through \(Shc/Grb2/m-Sos/Ras/Raf-1\) [where \(Grb2\) is the growth factor receptor-bound protein 2, \(Shc\) is an \(SH2\) (Src homology 2) containing adaptor protein that binds \(Grb2\), \(m-Sos\) is a mammalian homologue of the Drosophila son of sevenless gene (a GDP-releasing factor of \(Ras\)) and \(Raf\) is the serine/threonine protein kinase family downstream of tyrosine kinases and upstream of \(MEK\)]. \(PLC-\gamma 1\) (phospholipase \(C-\gamma 1\))/\(PKC\) (protein kinase \(C\)), \(Gab1\) (\(Grh2\)-associated binder-1)/\(PI3K\) (phosphoinositide 3-kinase)/\(Akt\) (a product of the \(v-akt\) oncogene \(\cong\) protein kinase \(B\)) and \(Crk/C3G/Rap1/B-Raf\) (where \(Crk\) is an oncogene, adaptor protein containing \(SH2\) and \(SH3\) domains and \(C3G\) is a guanine nucleotide-exchange factor that activates \(Rap1\)).

nerve growth factor initiates neuronal differentiation through a receptor tyrosine kinase, leading to a complex signaling cascade

nerve growth factor flips a switch, signaling the cell’s machinery to start making nerve cell proteins.

anticipate questions. prepare for them.
never EVER go over time.

grad school is a personal experience

know who you are
• know your work ethic
  – set goals and stick to them (D/W/M/Y)
  – know when/why you procrastinate
• recognize when you’re in a trouble spot
  – take some time off or an LOA
  – changing advisors/projects is OKAY
• stay positive
• be independent

know where you’re going

“Your goal as a graduate student is to become an expert in wielding the scientific method, and this can be achieved pursuing any project.”

look for an occupation that you like, and you will not labor a single day in your life.
all roads do not lead to PI

% of US Biomedical Science PhDs Holding Tenure or Tenure-Track Positions

Source: http://sestat.nsf.gov/

where do the other ~75% go?

- government
  - research, policy, funding agencies
- industry
  - every kind of job under the sun
- other academia
  - teaching position, RAs, administration
- other fields
  - business (MBA), law, health care, media

know where you want to go

- structure extra-curricular activities accordingly:
  - conferences
  - teaching opportunities
  - professional organizations
  - clubs
  - seminar series
  - outreach activities
- seek out mentors
  - talk to your advisor about your interests!

don't play to stereotypes

“Scientific talent is not a single parameter, but a complex mix of innate skills and learned abilities...”

...There is no one path to success and each successful scientist has unique combinations of strengths.