Bill Freeman
Associate Department Head
Electrical Engineering and Computer Science
Massachusetts Institute of Technology
Pictorial display of my own background.

Polaroid 1981-1987

China 1987-1988

PhD 1988-1992

MERL 1992-2001

MIT 2001-present
Elements of a successful graduate career

I crowd-sourced the rest of this talk. Earlier this week, I sent out this e-mail to the MIT Computer Science faculty and other CSAIL researchers:

Could each of you please send me what you think is the most important quality for success in graduate school?

Following are the answers I got back.
Desired qualities
The most important qualities: curiosity and creativity

Tommi Jaakkola
Here are my desired qualities:

Determination, curiosity and flexibility, willingness to work hard,

try not to be ruled by fear...

Shafi Goldwasser
You want to be a marathon runner, not a sprinter.

(Not necessarily just the good, quick answers, as in a class. Want to be able to come up with the more thoughtful answers, too).

Brian Williams
Purposefulness.

You are in grad school for a purpose (whatever your purpose is) and it is up to you see that purpose accomplished. Now, when nobody's telling you what to do, you have to tell yourself.
Total fascination with an area of science coupled with drive and imagination!

Dave Gifford

My first thoughts are: persistence, courage, flexibility
My choice for most important: persistence.

Jack Dennis

Pete Szolovits

Enthusiasm, curiosity, lots of energy, and scholarship. Being smart also helps, but admissions has already taken care of that.
Advice
Enjoy the freedom you have in graduate school to be creative

Frans Kaashoek
Figure out what you love, and do it (since you are going to be doing it for a while).

If you cannot figure out that there is something that you actually want to do, you will drift, lose your way and fail.

Dave Clark
The most important criterion is to "explore (and embrace) things you don't understand, as opposed to avoiding things you don't understand."

Srini Devadas
Take what you are good at and grow it.

“They didn’t know it was impossible, so they did it.” Too many students think it isn’t possible to do something, so what stops them is themselves. Once they unlock what was stopping them, nothing is impossible.

Aude Oliva
I think the most important thing in research is a story -- not a theorem or an algorithm -- but the story that makes the theorem or algorithm interesting and exciting. It’s important to have an "ear" for a good story... when do the stories make sense, when are they bogus?
The advisor
The best students are possessed by a problem. They're independent. They teach their advisors. They don't do what they're told...they do something more interesting.

(But maybe that's a scary thing to tell new students....but it's true).

Leslie Kaelbling
Be more stubborn than your advisor

Polina Golland
Don't tell your advisor you're doing what they advised against until you’ve solved the problem.

Manolis Kellis
Bill,

I'll tell you a joke instead.

A rabbit is caught by a wolf. The wolf is about to eat the rabbit, but the rabbit protests, "I'm only a few weeks away from defending my Ph.D. dissertation. I have worked so hard, and everyone tells me I have so much promise. It would be a shame to kill me when I have such a bright future of research contributions ahead of me that will benefit the world." The wolf says, "You're writing a Ph.D. dissertation? What is it on?" The rabbit replies, "It's entitled, The Superiority of Rabbits over Foxes and Wolves." The wolf says, "That's about the stupidest thing you could have said. I'll eat you right now." The rabbit says, "Wait, wait! Come to my den and read my thesis draft. If you don't agree with my conclusions, I will willingly give myself up to you." So, the wolf goes off with the rabbit to the rabbit's den ... and the wolf never comes out.

A few weeks later, the rabbit is caught by a fox. The fox is about to eat the rabbit, but the rabbit protests, "I'm only a few days away from defending my Ph.D. dissertation. I have worked so hard, and everyone tells me I have so much promise. It would be a shame to kill me when I have such a bright future of research contributions ahead of me that will benefit the world." The fox says, "You're writing a Ph.D. dissertation? What is it on?" The rabbit replies, "It's entitled, The Superiority of Rabbits over Foxes and Wolves." The fox says, "That's about the stupidest thing you could have said. I'll eat you right now." The rabbit says, "Wait, wait! Come to my den and read my thesis draft. If you don't agree with my conclusions, I will willingly give myself up to you." So, the fox goes off with the rabbit to the rabbit's den ... and the fox never comes out.
A few weeks later, the rabbit is out and meets up with his old friend the muskrat. The muskrat says, "I hear you finally earned your Ph.D. Congratulations!" The rabbit says, "Yes, I just defended my Ph.D. thesis a few days ago." The muskrat asks, "What was your thesis topic?" The rabbit answers, *The Superiority of Rabbits over Foxes and Wolves.* The muskrat says, "That's quite interesting. Can I read it?" The rabbit says, "Sure. Come to my den." They enter the den, and the muskrat sees the bones of foxes and wolves all over the floor. In the corner is a large lion.

Which brings us to the moral of the story: *More important than your thesis topic is who your advisor is.*
Maybe instead of "quality for success" (which sounds like it's just about the student), might be better to call them "ingredients" of success?

So here's an ingredient: a supportive advisor. Image attached.

Rob Miller
SON

I AM DISAPPOINT
Rules of thumb
Bill, I can offer a couple of rules:

#1: Listen to everything your advisor tells you

#2: Don’t listen to anything your advisor tells you.

there may be a time-dependent alpha in front of rule 1 and (1-alpha) in front of rule 2.
As t -> infinity, alpha -> 0...

#3: (Truly) the most important: believe in yourself and never stop persevering.

Una-May O’Reilly
* Communicating with your advisor when things are not going well.

* Good grad students need to be Renaissance men/women: program, experiment, come up with ideas, write, speak well.

* Sometimes you have to cut your losses and work on something else. But otherwise, finish what you start. Persistence, but good judgment.
--Be open: take lots of courses, talk to lots of people, attend seminars.
--Be focused: pick a small project first and get it done.
--Refine your message: at frequent intervals, rework your elevator pitch (and try it out on people who are _not_ in your research area)
Eat, sleep, and breathe a problem until you crack it.

Put everything you have into your problem.

Become the world’s foremost expert on your thesis topic.

Surpass your advisor.
(1) Don’t waste time doing research you don’t love.

(2) Don't waste time doing research that other people can do better than you can.

(3) Don't waste time doing research that other people in your field won't care about. (It's okay, and probably a good sign, if some people won't appreciate it, as long as enough people will.)

It's relatively common to find projects that satisfy two out of three of these criteria. But don't settle for your PhD: aim for all three!
Short
Writing and communication.

Taste

Fredo Durand
Being fearless

Regina Barzilay
Passion! A passionate interest in the thesis topic.

Stephanie Seneff
The passion to pursue an idea despite uncertainties.

Daniela Rus
Guts!

Silvio Micali
Welcome. Welcome to MIT, welcome to Cambridge.
and, at a higher level, welcome to research; welcome to a community of people who are passionate about what they do!

“human clock” showing how my time in graduate school relates to yours. (My daughter at my PhD graduation, embarking for school, and embarking for semester abroad last year).

waiting for bus, first day of school, 1996

leaving for semester abroad in India, 2011

MIT graduation, 1992