04: Planning and time management

February 3, 2012
Announcements

- Observations/challenges from the literature search assignment
- You’ll have my feedback no later than Fri Feb/13
The “Ph.D.” perspective

There are four requirements for a successful career in science: knowledge, technical skill, communication, and originality or creativity. Many succeed with largely the first three. Those who are meticulous and skilled can make a considerable name by doing the critical experiments that test someone else’s ideas or by measuring something more accurately than anyone else. But in such areas of science as biology, anthropology, medicine, and theoretical physics, more creativity is needed because phenomena are complex and multivariate.

Most people can learn to be far more creative than they are. Our school system emphasizes single correct answers and provides few opportunities for exploratory learning, problem solving, or innovation. Suddenly, when one becomes a graduate student, however, it is expected that one is automatically an independent thinker and a creative problem solver.

Loehle, “A guide to increased creativity in research – inspiration or perspiration?”
The “MBA” perspective

“Discovery” skills

Courage to innovate

Challenging the status quo

Taking risks

Behavioral skills

Questioning

Observing

Networking

Cognitive skill to synthesize novel inputs

Associational thinking

Innovative business idea

“Delivery” skills

following four delivery skills: analyzing, planning, detail-oriented implementing, and disciplined executing. (We’ll say more about these skills later in the chapter and in chapter 8, but for now we need only note that they are critical for delivering results and translating an innovative idea into reality.)

Dyer, Gregersen, and Christensen, The Innovator’s DNA
Discovery vs. delivery skills?

The practice of doing good research

| methodical | a stepwise approach to answering the overarching research question; sequential |
| goal-oriented | having the end objective in mind |
| critical | rigorous in one's analysis; questioning |
| flexible | being able to take a new approach upon failure; adaptable |
| well-documented | organized and proper aggregation and explanation of information |
| ethical | |

Evaluating good research

| thorough | comprehensive presentation of your approach and solution/result |
| elegant | simple and concise |
| relevant | there must be a question to match the answer |
| repeatable | consistency |
| novel | creative, new solution |

Attributes of a good researcher

| zealous | curious and passionate; likes questioning everything |
| communicative | shares and receives information well |
| perseverent | able to overcome obstacles without losing motivation; not afraid of failure |
| versatile | able to apply knowledge from other fields; critical open-mindedness |
| balanced | self-aware of one's own limits; applied personal self-awareness |
| genius | creative, original, intellectual |
The business and executive skill life cycles

<table>
<thead>
<tr>
<th>Organization imperative</th>
<th>Organization primarily rewards</th>
<th>Organization secondarily rewards</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Develop and launch new business idea</td>
<td>- Discovery skills</td>
<td>- Delivery skills</td>
</tr>
<tr>
<td>- Scale the new business idea</td>
<td>- Delivery skills</td>
<td></td>
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<tr>
<td>- Build processes to execute consistently and systematically</td>
<td>- Discovery skills</td>
<td></td>
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<tr>
<td>- Exploit resources and capabilities generated during growth stage.</td>
<td>- Delivery skills</td>
<td>- Delivery skills still dominate but discovery skills increase in importance</td>
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<tr>
<td>- Harvest, find or develop other new business ideas</td>
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FIGURE 1-4
Dyer, Gregersen, and Christensen, The Innovator’s DNA
Discovery and Delivery Skills Quiz: What’s Your Profile?

To get a quick snapshot of your discovery-delivery skills profile, take the following self-assessment survey (1 = strongly disagree; 2 = somewhat disagree; 3 = neither agree nor disagree; 4 = somewhat agree; 5 = strongly agree). Remember to answer based on your actual behaviors, not what you would like to do.

1. Frequently, my ideas or perspectives diverge radically from others' perspectives.
2. I am very careful to avoid making any mistakes in my work.
3. I regularly ask questions that challenge the status quo.
4. I am extremely well organized at work.
5. New ideas often come to me when I am directly observing how people interact with products and services.
6. I must have everything finished "just right" when completing a work assignment.
7. I often find solutions to problems by drawing on solutions or ideas developed in other industries, fields, or disciplines.
8. I never jump into new projects and ventures and act quickly without carefully thinking through all of the issues.
9. I frequently experiment to create new ways of doing things.
10. I always follow through to complete a task, no matter what the obstacles.
11. I regularly talk with a diverse set of people (e.g., from different business functions, organizations, industries, geographies, etc.) to find and refine new ideas.
12. I excel at breaking down a goal or plan into the micro tasks required to achieve it.
13. I attend conferences (on my areas of expertise as well as unrelated areas) to meet new people and understand what issues are facing them.
14. I pay careful attention to details at work to ensure that nothing is overlooked.
15. I actively seek to identify emerging trends by reading books, articles, magazines, blogs, and so on.
16. I hold myself and others strictly accountable for getting results.
17. I frequently ask "what if" questions that provoke exploration of new possibilities and frontiers.
18. I consistently follow through on all commitments and finish what I've started.
19. I regularly observe the activities of customers, suppliers, or other organizations to get new ideas.
20. I consistently create detailed plans to get work done.

To score your survey:

Add your score on the odd-numbered items. You score very high on discovery skills if your total score is 45 or above, high on discovery if your score is 40–45, moderate to high on discovery if your score is between 35 and 40, moderate to low if you score 29–34; you score low on discovery if your score is 28 or less.

Add your score on the even-numbered items. You score very high on delivery skills if your total score is 45 or above, high on delivery if your score is 40–45, moderate to high on delivery if your score is between 35 and 40, moderate to low on delivery if your score is between 30 and 34; you score low on delivery if your score is 29 or less.
if you score 29–34; you score low on delivery if your score is 28 or less.

We have drawn this short survey from a more systematic seventy-item assessment (either a self-assessment or a 360-degree assessment) that we have developed to assess an individual’s discovery skills and delivery skills. You can do this assessment through our Web site at http://www.InnovatorsDNA.com. Should you decide to complete an assessment, you will receive a development guide to walk you through your results and help you design a skill development plan. Your assessment will provide you with your DQ and percentile data for each discovery and delivery skill to compare your scores with the over five thousand executives and innovators in our dataset.
### Schedule (subject to change)

<table>
<thead>
<tr>
<th>#</th>
<th>Date</th>
<th>Theme</th>
<th>Pre-class task</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Jan/6</td>
<td>Course overview; recap of ME RFE/candidacy process</td>
<td>(Thurs 2pm)</td>
<td>(Fri 2pm)</td>
</tr>
<tr>
<td>1</td>
<td>Jan/13</td>
<td>Defining “research”; learning styles</td>
<td>Research words</td>
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<tr>
<td>2</td>
<td>Jan/20</td>
<td>Searching and analyzing the literature</td>
<td>Research theme</td>
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<tr>
<td>3</td>
<td>Jan/27</td>
<td>Creativity and impact; choosing a research topic</td>
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<tr>
<td>4</td>
<td>Feb/3</td>
<td>Planning and time management</td>
<td></td>
<td>Literature search</td>
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<tr>
<td>5</td>
<td>Feb/10</td>
<td>Advisor-student relations; mentorship and collaboration</td>
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<tr>
<td>6</td>
<td>Feb/17</td>
<td>Responsible conduct of research</td>
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<td></td>
<td>Feb/24</td>
<td>No class</td>
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<td>Background report</td>
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<td>Mar/2</td>
<td>No class (spring break)</td>
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<td>7</td>
<td>Mar/9</td>
<td>Formulating and writing a proposal</td>
<td>Proposal exercise</td>
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<td>8</td>
<td>Mar/16</td>
<td>Evaluating proposals</td>
<td>Proposal aims</td>
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<td>9</td>
<td>Mar/23</td>
<td>Graphics and visual aids</td>
<td>Proposal</td>
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<td>10</td>
<td>Mar/30</td>
<td>Giving and evaluating presentations</td>
<td>Proposal peer-review</td>
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<tr>
<td>11</td>
<td>Apr/6</td>
<td>Research administration and commercialization</td>
<td>Discussion topics</td>
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<tr>
<td>12</td>
<td>Apr/13</td>
<td>Student presentations (extended session)</td>
<td>Presentation</td>
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</tbody>
</table>
Three things

- Write down
  - Three skills (one word each if possible) that you are good at
  - Three skills that you’d like to improve at

- Make a copy

- Submit one, keep one for yourself
Today’s topics

- Defining hypotheses/questions
- Time management
  - principles
  - tools
  - methods

(2011 list – green ok, red improve)

- diligence, hard work
- creativity
- communication/writing/presentation
- identifying problems, asking questions
- efficiency
- focus

Related topics next week

- Teamwork and collaboration
- Delegation
- Meetings
- Managing “up”, i.e., working with your advisor
The scientific method

1. Define the topic area
2. Gather information and assess resources
3. Form a hypothesis (question/problem)
4. Design and conduct experiments; collect data
5. Analyze data
6. Interpret data and draw conclusions
7. Publish results
8. (Iterate or extend)
The importance of a good hypothesis

Hypothesis is the most important mental technique of the investigator, and its main function is to suggest new experiments or new observations. Indeed, most experiments and many observations are carried out with the deliberate object of testing an hypothesis. Another function is to help one see the significance of an object or event that otherwise would mean nothing. For instance, a mind prepared by the hypothesis of evolution would make many more significant observations on a field excursion than one not so prepared. Hypotheses should be used as tools to uncover new facts rather than as ends in themselves.

“a hypothesis is sometimes very fruitful without being correct”
“the vast majority of hypotheses prove to be wrong”

Beveridge, The Art of Scientific Investigation
Hypothesis vs. question

- **Hypothesis:**
  - “a supposition or proposed explanation made on the basis of limited evidence as a starting point for further investigation” (OED)
  - Example: ...(anyone?)

- **Question:**
  - stating something that you want to find out by doing your research
  - Example: ... (reformulating the example hypothesis)

- Here, we will use the terms interchangeably, although the formulation is different.
- In your background report you will identify “questions” that have not been answered, while in your proposal you may pose more specific questions or a central hypothesis for your work.
What makes a “good” research questions?

- Identified as a “gap” in knowledge based on your literature survey
  - Important to others in your field
  - Can be placed in Pasteur’s quadrant (last week)

- Clearly expressed in a sentence

- A specific outcome can be envisioned by an expert in your field

- Accessible based on knowledge/skills/resources you have or plan to acquire (you don’t need to discuss these in the background report)
Keep it simple

- “...unverified assumptions should be kept down to the bare minimum and the hypothesis with the fewest assumptions is to be preferred.” (Occam’s Razor)

William of Occam (1248-1347), English philosopher
“Entities must not be multiplies beyond what is necessary”

Nonlinear material behaviour of spider silk yields robust webs

Steven W. Crawford 1, 2, 3, Anna Tarakanova 1, 2, Nicola M. Pugno 4 and Markus J. Buehler 1, 2

Natural materials are renowned for exquisite designs that optimize function, as illustrated by the elasticity of blood vessels, the toughness of bone and the protection offered by nacre 1–5. Particularly intriguing are spider silks, with studies having explored properties ranging from their protein sequence to the geometry of a web. 6 This material system, highly adapted to meet a spider’s many needs, has superior mechanical properties 6–15. In spite of much research into the molecular design underpinning the outstanding performance of silk fibres 16–21, it remains unknown how the mechanical characteristics of spider silk contribute to the integrity and performance of a spider web. Here we report web deformation experiments and simulations that identify the nonlinear response of silk threads to stress—softerning at a yield point and substantial stiffening at large strain until failure—as being crucial to localize load-induced deformation and resulting in mechanically robust spider webs. Control simulations confirmed that a nonlinear stress response results in superior resistance to structural defects in the web compared to linear elastic or plastic (softening) material behaviour. We also show that under distributed loads, such as those exerted by wind, the stiff behaviour of silk under small deformation, before the yield point, is essential in maintaining the web’s structural integrity. The superior performance of silk in webs is therefore not due merely to its exceptional ultimate strength and strain, but arises from the nonlinear response of silk threads to strain and their geometrical arrangement in a web.

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Figure 1 | Material behaviour of dragline spider silk, web model, and behaviour of webs under load. a, Derived stress–strain ($\sigma$–$\varepsilon$) behaviour of dragline silk, parameterized from atomistic simulations and validated against experiments. There are four distinct regimes characteristic of silk: I, stiff initial response governed by homogeneous stretching; II, entropic unfolding of semi-amorphous protein domains; III, stiffening regime as molecules align and load is transferred to the $\beta$-sheet crystals; and IV, stick–slip deformation of $\beta$-sheet crystals until failure. b, Schematic of web model, approximated by a continuous spiral (defined by $dR$) supported by eight regular radial silk threads (defined by $dl$), typical of orb webs. c, Force–displacement curves for loading a defective web (results for model A; loaded region shown in red). Case studies include missing spiral segments (d1 to d3) and a missing radial thread (d4). The inset to c shows the in situ orb web as discovered, containing many defects (marked by green arrows). d, Force–displacement behaviour of web, comparing the loading of a single radial thread and a single spiral thread (model A). e, Loading of a spiral thread results in small web deformation. f, Loading applied at radial threads results in an increase in web deformation. In both cases (e and f) failure is isolated to the pulled thread in simulation and experiment, restricting damage to a small section of the web (indicated by white rectangles).
Figure 2 | Web response for varied silk behaviour under targeted (local) and distributed (global) loading. a, Comparison of failure for derived dragline silk, linear elastic and elastic–perfectly plastic behaviours (left, models A, A’ and A’’). Comparison of failure (centre) confirms localized stresses and minimized damage for the natural nonlinear stiffening silk behaviour. The average stress of each radial thread (bar plots, right) reflects the nonlinear deformation states in the silk. When load is applied locally to a radial thread, other radial threads not subject to applied force reach a stress corresponding to the onset of yielding (that is, regime II in Fig. 1a). The elastic–perfectly plastic behaviour leads to an almost homogeneous distribution of stress. b, Force–displacement curves for varying material behaviours (models A, A’ and A’’ and model B). c, Web behaviour under distributed (global) wind loading. The plot shows a comparison of the wind-deflection behaviour (models A, A’, A’’ and B). The initial high stiffness of natural dragline silk enhances the structural integrity of the web under such loading. Failure of all webs occurs at wind speeds in excess of 60 m s⁻¹.
Background report assignment
Due on ctools at 2p Friday, February 24

a. Guided by your literature search, identify the following:
   1. Two or three important (unanswered) questions related to your research topic.
   2. Two or three leading researchers in your field who are working (or have worked) toward answering these questions.
   3. A series of important techniques/achievements/discoveries (e.g., the seminal findings) related to the questions above. The leaders you identify may have made these achievements.

b. Based on the analysis from (a) write a report that:
   1. Introduces your research theme and its significance (1-2 paragraphs).
   2. Defines the questions you identified in (a). These can be listed so they are easy to identify.
   3. Reviews the contributions of the leaders, the seminal findings outlined in (a), and any other knowledge that you think is important to identify the frontier for your topic. There is no specific format for this; however, you should divide your text into subsections according to the key points you make, and make sure your information is presented in a logical order.
   4. Describes future directions, e.g., getting at what you hope to do in your research. Both fundamental (i.e., new scientific knowledge) and practical (i.e., commercial applications, impact on society) significance should be addressed. You don’t need to give a detailed description of your research (we’ll do that in the proposal).
Your report should be addressed to a general technical audience. Imagine giving it to someone who just joined your research group and wants to learn about your topic. Moreover, the reader should be convinced that it’s worth doing research on your topic, and should have a clear idea of the frontier for your research. And, keep in mind to address both breadth and depth (like the “T” principle discussed in class).

The report must be no longer than 5 pages and should include at least 10 references. The page limit includes figures, but does not include the bibliography. Make sure the bibliography uses a consistent reference format of your choice, which includes the full title of all journal articles that you cite. Margins must be 1” (left/right/top/bottom), and the text should be single-spaced, 11- or 12-point font.
A few more thoughts about research methodology and planning
Break a big problem into smaller ones

- http://www.youtube.com/watch?v=oZBzlJF6pNg
Always do control experiments

- “Controls are needed to eliminate alternate explanations of experimental results”

- **Negative control** – where the theory expects no phenomenon. Make sure there is no effect when there should be no effect, like giving a “placebo” to a group of test subjects for a new drug.

- **Positive control** – to show that the conditions of the experiment can bring about a positive outcome, even if the hypothesis is incorrect. For example, if you are testing a flu vaccine, expose a group of subjects to the flu to make sure the vaccine has a chance to work.

Propagating of Respiratory Aerosols by the Vuvuzela

Ka-Man Lai¹, Christian Bottomley², Ruth McNerney³*

¹ Healthy Infrastructure Research Centre, Department of Civil, Environmental and Geomatic Engineering, University College London, London, United Kingdom, ²MRC Tropical Epidemiology Group, London School of Hygiene and Tropical Medicine, London, United Kingdom, ³Department of Pathogen Molecular Biology, London School of Hygiene and Tropical Medicine, London, United Kingdom

Abstract

Vuvuzelas, the plastic blowing horns used by sports fans, recently achieved international recognition during the FIFA World Cup soccer tournament in South Africa. We hypothesised that vuvuzelas might facilitate the generation and dissemination of respiratory aerosols. To investigate the quantity and size of aerosols emitted when the instrument is played, eight healthy volunteers were asked to blow a vuvuzela. For each individual the concentration of particles in expelled air was measured using a six channel laser particle counter and the duration of blowing and velocity of air leaving the vuvuzela were recorded. To allow comparison with other activities undertaken at sports events each individual was also asked to shout and the measurements were repeated while using a paper cone to confine the exhaled air. Triplicate measurements were taken for each individual. The mean peak particle counts were $658 \times 10^3$ per litre for the vuvuzela and $3.7 \times 10^2$ per litre for shouting, representing a mean log₁₀ difference of 2.20 (95% CI: 2.03.2.36; p<0.001). The majority (>97%) of particles captured from either the vuvuzela or shouting were between 0.5 and 5 microns in diameter. Mean peak airflows recorded for the vuvuzela and shouting were 6.1 and 1.8 litres per second respectively. We conclude that plastic blowing horns (vuvuzelas) have the capacity to propel extremely large numbers of aerosols into the atmosphere of a size able to penetrate the lower lung. Some respiratory pathogens are spread via contaminated aerosols emitted by infected persons. Further investigation is required to assess the potential of the vuvuzela to contribute to the transmission of aerosol borne diseases. We recommend, as a precautionary measure, that people with respiratory infections should be advised not to blow their vuvuzela in enclosed spaces and where there is a risk of infecting others.


Editor: Vishnu Chaturvedi, New York State University at Albany, United States of America

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Competing Interests: The authors have declared that no competing interests exist.

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Figure 1. Experimental setup of vuvuzela and shouting experiments. An anemometer or particle counter were positioned at the bell of the vuvuzela to measure the velocity of air leaving the device and to capture and count aerosolized particles. Study participants also shouted into a cone tapered to the same diameter as the vuvuzela bell and measurements were repeated.

doi:10.1371/journal.pone.0020086.g001

http://en.wikipedia.org/wiki/Vuvuzela
Figure 2. Concentration of airborne particles exiting the vuvuzela or shouting cone by their diameter. Peak concentration of particles captured at the exit of the vuvuzela and shouting cone when used by eight volunteers, four female and four male. Data points are means of triplicate experiments.

doi:10.1371/journal.pone.0020086.g002
Always be critical and be willing to reconsider

- Examine your ideas critically before fixing your hypothesis
  - “it must be submitted to most careful scrutiny before being accepted even as a tentative hypothesis, for once an opinion has been formed it is even more difficult to think of alternatives.”

- Be ready to modify (or even abandon) your hypothesis if it is shown to be inconsistent with the facts (results)
  - “…with as few regrets as possible.”
  - “The scientist who has a fertile mind and is rich in ideas does not find it so difficult to abandon one found to be unsatisfactory as does the man who has few.”
  - BUT be persistent: “There is a great difference between (a) stubborn adherence to an idea which is not tenable in face of contrary evidence, and (b) persevering with an hypothesis which is very difficult to demonstrate but against which there is no direct evidence.”

Beveridge, The Art of Scientific Investigation
But, don’t be afraid of uncertainty

There is nothing reprehensible about making a mistake, provided it is detected in time and corrected. The scientist who is excessively cautious is not likely to make either errors or discoveries. Whitehead has expressed this aptly: “panic of error is the death of progress.” Humphrey Davy said: “The most important of my discoveries have been suggested to me by my failures.” The trained thinker shows to great advantage over the untrained person in his reaction to finding his idea to be wrong. The former profits from his mistakes as much as from his successes. Dewey says:

“What merely annoys and discourages a person not accustomed to thinking . . . is a stimulus and guide to the trained enquirer. . . . It either brings to light a new problem or helps to define and clarify the problem.”

The productive research worker is usually one who is not afraid to venture and risk going astray, but who makes a rigorous test for error before reporting his findings. This is so not only
Have a flexible path in mind

<table>
<thead>
<tr>
<th>The objective schema can lead to frustration when the project goes off track</th>
<th>The nurturing schema gives support and opens new directions</th>
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<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
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</table>

“and with this schema we have more space to see that problem C exists and may be more worthwhile than continuing to plod toward B”

What we don’t want

Zheng Lab - Bad Project (Lady Gaga parody)

I want good data

http://www.youtube.com/watch?v=Fl4L4M8m4d0

3,344,628 views as of Jan 2012
How do you manage your time?
What are your most annoying tasks?

What tasks would you like to manage better?
Who needs a personal productivity coach?
Why need a time management **strategy**?

- We will always have more demands on our time; thus, we need to keep track of things at multiple levels

- Bad time management = **stress**

- Time management is an important **life** skill, way beyond research

- Efficient doesn’t imply impolite; it’s very much the opposite.
Why it’s difficult to manage academic time

- Lots of choices (academic “freedom”)

- Lots of open-ended tasks (i.e., research)

- Universities (especially big ones) are sometimes bureaucratic, e.g., some simple administrative actions involve several levels of communication/approval

- We need to balance short-term and long-term interests, and we need “thinking time” which may not be urgent but is VERY important

- We’re learning as we go...
Being Bob Langer

Running one of the biggest academic labs in America gives Robert Langer almost 100 people to help and advise; his BlackRock gives him the rest of the world. Helen Pearson joins him on the journey.

At 1:16:26 in the afternoon on an icy Tuesday in January, Robert Langer is getting dressed in his usual lab coat and black shoes. He has been working in a lab for the past 10 years and his favorite activity is solving problems. He is known for his innovation and creativity, and he often comes up with new ideas while working alone in his lab.

When he first started at MIT, Langer had no idea what he wanted to do with his life. He was interested in medicine and engineering, but he didn’t know how to combine the two. He decided to start a research lab at MIT and work on developing new technologies that could help people.

The lab has grown significantly over the years, and now has more than 100 employees. Langer is often seen walking around the lab, talking to his team and discussing new ideas for projects.

One of the most important things Langer does is to encourage his team to think creatively and come up with new ideas. He believes that innovation is the key to success, and he always tries to create an environment where his team feels comfortable taking risks and trying new things.

In his free time, Langer enjoys reading and spending time with his family. He is a proud father of two grown children and enjoys spending time with them. He also enjoys traveling and exploring new places.

Robert Langer is a true leader in the world of engineering and medicine, and he continues to push the boundaries of what is possible with his innovative ideas and projects.

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*By Helen Pearson*

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Inspiration and resource

Time Management

Randy Pausch
Carnegie Mellon University

http://www.cs.virginia.edu/~robins/Randy/
“Most of the stress people experience comes from inappropriately managed commitments they make or accept.

Even those who are not consciously stressed out will invariably experience greater relaxation, better focus, and increased productive energy when they learn more effectively to control the ‘open loops’ of their lives”

-David Allen
How can we always be focused?
The **extended will**: 

“...external tools and techniques that help the parts of ourselves that actually want to work”

“You’ll be better equipped to undertake higher-focused thinking when the underlying tools and techniques [for “getting things done”] are part of your ongoing operational style”

-David Allen
other things to do
distraction
mess

you
goal
Allen’s approach to managing actions

1. Collect things that command your attention
2. Process what they mean and decide what to do about them
3. Organize the results (=actions you decided)
4. Review (daily, weekly)
5. DO

1-4 are “horizontal” and 5 is “vertical”

Start by listing all your projects/commitments, and related actions

This is a continuous and iterative process!
Processing and organizing

“stuff”

- In-basket
  - What is it?
  - Is it actionable?

  yes

  - Projects (planning)
    - Multistep projects
  - Project plans (review for actions)

  - What's the next action?

  - Will it take less than 2 minutes?

    yes

    - Do it
      - Waiting (for someone else to do)

    no

    - Delegate it
      - Calendar (to do at a specific time)
    - Defer it
      - Next actions (to do as soon as I can)

  no

  - Trash
    - Someday/maybe (ticker file; hold for review)
  - Reference (retrievable when required)
“It’s a waste of time and energy to keep thinking about something that you make no progress on”

-David Allen
How do I prioritize and prevent some things from slipping through the cracks?
The goalsheet

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<td>18</td>
<td>Goals: previous 2 weeks [copy previous 2 weeks here and reflect]</td>
<td>% achieved</td>
<td>Comments on progress [1-2 sentences about outcome and interpretation]</td>
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2-week goals

A.J. Hart | 49
Always review short- and long-term plans
Always think horizontal and vertical

Like a deep sea diver riding a jetski
The “80/20” rule

- A very small number of things create a very large part of the total value in your work
  - [A very small number of experiments create the vast majority of results that will be in your thesis!]

- So, how do I prioritize so I maximize the time spent on tasks that generate value?
The four quadrants [Pausch 28:20-31:00]

Adapted from Covey’s “7 Habits”
The four quadrants

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<tr>
<td>Not Important</td>
<td>3</td>
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</table>

- But sometimes we need a little of #3/#4

Adapted from Covey’s “7 Habits”
How do I decide what to do?

1. Context
2. Time available
3. Energy available
4. Priority
“Remember, that time is money.

He that can earn ten shillings a day by his labor, and goes abroad, or sits idle, one half of that day, though he spends but six pence during his diversion or idleness, ought not to reckon that the only expense; he has really spent, or rather thrown away, five shillings besides.”

-Benjamin Franklin, 1748
What is the value of your time?

$$$

$$$

$\$$
How do I spend my time? [Pausch 56:30-59:15]

- Monitor yourself in 15 minute increments for up to 2 weeks

- Update it during the day, not at the end

- Has anyone done this?
Fred Brooks’ time clocks
Review your journal and ask

- Am I considering the urgent-important quadrant?

- What doesn’t need to be done?

- What can I do more efficiently?

- What could I do more effectively with help?

- How am I wasting others’ time?

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Know when you’re good at what

- Find your creative time (and place), and defend it! This is a good time to do difficult experiments, write, or have important meetings.

- Find your dead time and schedule mundane things then, like boring meetings or cleaning your lab bench!
Schedule your gap times

Course | Sec | Units | Professor | Course Name
---|---|---|---|---
15-211 | E | 12.0 | Blum, Goldstein | Fundamental Structs of Computer Science I
18-200 | C | 12.0 | Hoburg | Mathematical Foundations of EE
18-240 | B | 12.0 | Thomas | Fundamentals of Computer Engineering
33-107 | G | 12.0 | Meyer, Feenstra | Physics for Engineering Students II
80-210 | A | 9.0 | Scheines | Introduction to Logic
Know when/where to stop

Stay on the leading edge!
Eliminate simple things that waste time

- Interruptions
- Messy desk/lab
- No calendar → missing appointments
- Being unprepared/late for meetings
- Being too tired thus unable to concentrate

→ Research [Pauch] says that these waste 2 hours a day!

GET ORGANIZED!
Avoid interruptions (grrrrrrrr)

- Say each interruption takes 7 minutes, and you need 5 minutes to recover (= full focus): 5 interruptions = 1h gone!

- Reduce the frequency and length of interruptions, e.g.,
  - Put ideas into bins for later
  - Make best use of phone and email
  - Don’t check email continuously
  - Ignore your mobile phone!
  - Busy status on chat
  - Limit web surfing...

- On the contrary, if it’s really quick:
  - do it now but put yourself in a position to reduce the number of interruptions
Keep it empty
Touch each email only once
Archive only what’s necessary
No backup = no excuse!

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How does your environment encourage/discourage wasted time?
“Procrastination is the thief of time.”

-Edward Young, 1742
(6y before Ben Franklin)

“Procrastination most often arises from a sense that there is too much to do, and hence no single aspect of the to-do worth doing. . . . Underneath this rather antic form of action-as-inaction is the much more unsettling question whether anything is worth doing at all.”

-Mark Kingwell
An internal struggle?

“...the person who makes plans and the person who fails to carry them out are not really the same person: they’re different parts of what the game theorist Thomas Schelling called “the divided self.” Schelling proposes that we think of ourselves not as unified selves but as different beings, jostling, contending, and bargaining for control.”

http://www.newyorker.com/arts/critics/books/2010/10/11/101011crbo_books_surowiecki#ixzz1DbjBVZVa
Consider the “cones of annoyance”...how soon before its deadline does a task start to bother you? The shape of the function changes if you know you’re going to procrastinate!
“Academics, who work for long periods in a self-directed fashion, may be especially prone to putting things off.”

-James Surowiecki, 2010

College of Engineering Proposal Deadline and Administrative Shell Policy (Effective 1 January 2012)

CoE Proposal Deadline Policy Preamble

The CoE is reputed to be the most frequent abuser of DRDA proposal deadline policy. This practice of late delivery occasionally leads to failure to submit to sponsor and almost always leads to a rushed process with concomitant defects and aggravation of the DRDA staff. The customer service orientation of DRDA usually accommodates offenders of the policy so it has been difficult to enforce it.

To address this continuing problem, we have negotiated a relaxed deadline for delivery of a proposal to DRDA with the intent of enforcing it by returning proposals that miss the deadline. The proposed policy is described below.

CoE Deadline Policy (effective January 1, 2012)

DRDA has graciously agreed to pilot a new 2-day deadline policy for CoE proposals. The finalized proposal must arrive at DRDA 2 business days before the sponsor deadline date. DRDA will not begin the review process until the proposal is finalized within the eRFM and sponsor on-line systems.

Under this pilot program, the ePAF including the CoE Admin Shell (defined below) must be received in the CoE’s research office 4 business days prior to the sponsor deadline date. (Please note: the ePAF will not route to the CoE research office until all other departments and schools/colleges have signed off.)

Proposals arriving after the CoE deadline will not be approved

In rare cases where the PI team will be unable to meet this deadline, an exemption request must be made to the Associate Dean for Research. This exemption request must be made no later than one day prior to the CoE deadline date. Exemption requests after the deadline date will not be considered.
Battling procrastination

- Set a deadline for yourself (and stick to it!)
  - Doing things just in time is much better than a last minute frenzy

- Step out of your comfort zones

- Identify why you aren’t enthusiastic about something

- Don’t fear embarrassment or failure

- Ask for help when you’re not sure what to do next
IMPORTANT: Be accountable

- Set stretch goals (deadlines for yourself) and more realistic deadlines when others are depending on you.

- Never break a promise → if you won’t be finished on time, try to renegotiate the deadline ahead of time.

- Be open and clear about your priorities (e.g., “I can’t do X right away because I need to do Y”).

- Don’t take on too many responsibilities: if you don’t have time to do it right, you don’t have time to do it wrong.
Homework

- Reading for lecture 5 (on ctools)
  - Rackham graduate student mentoring guide

- Other references (in same folder)
  - Malmgren et al., “The role of mentorship in protégé performance”
  - Green and Bauer, “Supervisory mentoring by advisors: relationships with doctoral student potential, productivity, and commitment”

- ? For group discussion in class, draft the questions that will guide your background report (you don’t need to submit these)

- Bring 3 copies of 1 page with
  - Your research summary
  - The questions