What Does Success Look Like at a Govt Lab, Academia, industry, vs Start-Up Company?
Distinguishing the Attributes of a Professional in Different Working Cultures

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Mark Horstemeyer Background

- 15 years: Sandia National Labs (govt lab)
- 10 years: Mississippi State University (academia)
- 1 year: Owens Corning Fiberglas (large company)
- 5 years: Predictive Design Technologies (start-up company)
Science of Success (Koch) can occur in any working environment

- Success is optimizing human action; science of optimizing human action
- Five dimensions
  - **Vision/Mission**: Determining where and how the organization can create the greatest long-term value
  - **Virtue and talents**: Helping ensure that people with the right values, skills and capabilities are hired, retained and developed
  - **Knowledge processes**: Creating, acquiring, sharing and applying relevant knowledge, and measuring and tracking profitability
  - **Decision rights**: Ensuring the right people are in the right roles with the right authority to make decisions and holding them accountable
  - **Incentives**: Rewarding people according to the value they create for the organization
## Science of Success Relation to Hiring Options

<table>
<thead>
<tr>
<th>Dimensions of success</th>
<th>Govt Labs</th>
<th>Academia</th>
<th>Large Company</th>
<th>Start-Up Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vision/mission</td>
<td>Security (weapons &amp; energy)</td>
<td>Educating students</td>
<td>Specific to niche</td>
<td>Specific to niche</td>
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<tr>
<td>Virtues/Talents</td>
<td>PhD desired</td>
<td>PhD required</td>
<td>BS degree</td>
<td>BS degree</td>
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<tr>
<td>Knowledge Processes</td>
<td>Teaming environment; more limited focused work</td>
<td>More individualistic; more freedom in work topics</td>
<td>Bottom line focus; strategic</td>
<td>Bottom line focused; tactical</td>
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<tr>
<td>Decision Rights</td>
<td>Modest accountability</td>
<td>Not too accountable</td>
<td>Greatest accountability</td>
<td>Modest accountability</td>
</tr>
<tr>
<td>Incentives</td>
<td>High quality of life</td>
<td>Great human impact</td>
<td>Varies with company</td>
<td>Great financial rewards</td>
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</table>

*October 7-11, 2012 – Pittsburgh, Pennsylvania*
## Summary of Attributes

<table>
<thead>
<tr>
<th></th>
<th>Intellectural Freedom</th>
<th>Salary</th>
<th>Teaming</th>
<th>Leave work at work</th>
<th>Benefits</th>
<th>Innovation</th>
<th>Science</th>
<th>Citizenship service</th>
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<th></th>
<th>Travel</th>
<th>Security</th>
<th>Organization</th>
<th>Grantsmanship</th>
<th>Publish</th>
<th>Mentors</th>
<th>Teaching</th>
<th>Progress to management</th>
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Qualities of an Effective Professor

• Teaching
• Research
• Journal Article Writing
• Mentorship of Graduate Students
• Grantsmanship/Proposal Writing
• Citizenship/Service to Others
• Team Player/Collaborations
• Organizational Skills
Teaching/Learning

- Teaching is the “giving of information” and learning is the “receiving of information”
- Acting, bringing energy to the classroom; know as many names as possible of the students and call them by name
- Have a willingness to bring research into the teaching environment
- Employ different methods: distance learning, hands-on, practical applications; move teaching methods as the audience changes
- Have a sense of humor
- Be available
- The students need to know that you care
- Necessary but not sufficient condition for tenure
Research

• Production: keep publishing in the area of your PhD
• Production Capability: Think about off-shoot research areas to grow from your PhD
• Look for high impact researchers to collaborate with
• Ask more seasoned successful researchers what areas would they get into if they were starting over
• Be ready to try new research areas; don’t be stuck in just one area (Who Moved My Cheese means the funding sources will change and you need to move)
• Think about the future and what engineering technologies of tomorrow will drive the research of today
• Keep the notion of what will be your impact (journal impact factor, on students, on society)
Journal Article Writing

• This is by far the most important influential, impacting attribute that one can grow into
• Decide on journals based upon the citation impact factor and have a strategy to rotate your article submissions to several of those journals to broaden the readership
• Keep prioritized list in front of you everyday of the working journal articles and “focus and finish” your number one on the list with every spare (or planned) moment
• Read good writers; not every journal article is written well
• If Journal Article Writing is the “cause,” the “effects” are the following:
  – Proposals being won (proposals without publications will not win because the reviewers will question the ability of the proposer)
  – Impact factor increasing
  – Influence on research community (this is a long term effect)
  – Prestige for your institution
  – Invitations to speak at other institutions
Mentorship of Graduate Students

• This is really a part of “Teaching,” but because of its importance needs to stand alone
• Greatest influence on an individual’s life can occur here, because you will set the course for their career
• Meet periodically (every relationship is different) with student or with the group together
• Set up the environment so the grad students learn from each other
• Understand social styles of mentor and grad students (driver, analytical, amiable, and expressive)
• Train them in three areas:
  – *Research*: analyzing and thinking deeply and thoroughly on a topic in a pro-active not reactive manner
  – *Writing*: communicating their research through this venue helps focus the research and document their efforts. I say three journal articles and then they are done.
  – *Speaking*: communicating their research through this venue also helps focus and organize their research. This skill helps prepare them for their career
Grantsmanship/Proposal Writing

• Talk to the program manager before submitting a proposal; relationships are important.
• You need to substantiate your proposal with your journal articles
• Take the proposal writing as an opportunity to collaborate with a more experienced researcher to get new ideas
• Proposal writing is difficult and takes time, but the results are great when you win a grant
• Diversify your portfolio with different funding sources
• I often write a proposal after the work is done but before the associated papers are written; this brings clarity to the proposal and ensures success
• Read winning proposals
• Four steps to every proposal:
  – Current state of the art: lit review
  – Future state after you complete the proposed project: your vision
  – Challenges/Barriers that have hindered researchers to realize the future
  – Research Roadmap: to overcome the challenges/barriers and place here any preliminary results to help the reviewers see that you can do the work
Citizenship/Service to Others

• To industry/society: join societies and become members or working groups; this will lead you to becoming a fellow someday and will indirectly help you in other’s reviewing your journal articles and proposals
• To your university: helps you see the bigger picture and affords opportunities of growth
• To your department/college: builds camaraderie and trust in relationships
Team Player/Collaborations

• Most journal articles and proposals are published with multiple names these days indicating the role of good collaborative teams
• You get different ideas and can synergize
• Identify your weaknesses and try to fill them by collaborating with others with those strengths
• Think of people within your department, college, university, country, and then internationally and come up with a plan to work with them
• Sometimes offering your student to spend time with the other collaborator is a good idea as it forces the relationship to a deeper level
• Think of the “win” for the potential collaborator; why would that person want to collaborate with you
Organizational Skills

- Start with the end in mind (your life, your career, your time in that job, etc.)
- Lay out your vision, then mission, then goals, then objectives, and then tasks
- Place emails, papers, etc. into categories so that when they cross your path, they have a place to go to
- I organize journal articles by authors names and topical areas so sometimes I put one article in two locations
- Plan your year, your semester, your day; if you fail to plan, you plan to fail
- Read “7 Habits of Highly Effective People”
- Manage your time well; don’t let the “urgent” negate the “important”
Social Styles

Project focused

Inward

Analytical

Amiable

Outward

Driver

Mark Horstemeyer

Expressive

People focused