



**GRYPHON
SCIENTIFIC**

FROM SCIENTIST TO CONTRACTOR: THE SHORT BUT TWISTED JOURNEY FROM THE BENCH TO THE OFFICE

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PURPOSE AND OVERVIEW

- **Overview:**
 - Describe the businesses that advise the government, focusing on my expertise in the sciences
 - Describe the path I took from the laboratory to founding a successful, small business
 - Describe the skills and qualities of those who successfully make the transition from the lab to the office

WORKING WITH THE GOVERNMENT

- **Every day, the government issues hundreds of solicitations**
 - These are like “help wanted” ads that the gov’t makes public
 - These solicitations cover a variety of topics
 - They cover everything the government needs done
 - From providing janitorial services at the National Zoo, to painting murals in federal buildings, to wreck diving in the Caribbean, to taking surveys of rare plants in the Sequoia National Forrest.
- **Of these solicitations, a subset requires technical or scientific expertise**
 - Running or working in a laboratory
 - Building or maintaining cutting edge equipment (like running a genomics facility)
 - Providing in-depth analysis of a technical topic
 - Managing technical projects performed by others

WHY THE GOVERNMENT NEEDS TECHNICAL HELP

- **There are hundreds of government-run laboratories, they need staff to perform the work**
 - National Labs, FDA, USDA, military, Veterans Administration
- **To perform its functions, the government needs savvy people to build, operate and maintain technical equipment**
 - From phones in the Pentagon to baggage scanners at airports to viral assay systems for flu surveillance
- **The executive branch (the departments) often has to make decisions on technical topics, without being technical experts themselves**
 - What is a good vaccination strategy for an outbreak of H5N1 flu?
 - How can we prevent the diversion of fissile material?
 - How should we allocate limited funds on disease research?

HOW DOES THE GOVERNMENT EMPLOY SCIENTISTS

- **To perform these duties, the government uses scientists in many ways**
 - As government employees
 - Scientists are employed directly by the departments
 - This is getting more rare as the cost of government employees compares unfavorably to contractors
 - As employees of Fed. Funded R&D Centers
 - National Labs and various institutes
 - As contractors
 - Both for profit and not-for-profit
 - Range in size from very large to very small
 - Largest makes ~\$5 Bn a year (mostly not based on scientific support, per se)
 - Smallest are one-person consulting outfits
 - Most people who work in government buildings are actually contractors

SO, HOW DID I GO FROM BEING A SCIENTIST TO WORKING AS A CONTRACTOR?

- **Academe, the early years**
 - I majored in chemistry and biology and worked in the lab as an undergraduate on average 20 hours a week
 - I really enjoyed working in the laboratory and found that time “flew by”, which was helped by the fact that my experiments largely succeeded
 - I also enjoyed taking classes and learning about a variety of topics in the sciences
 - So, I went directly to graduate school
 - At the time, MIT didn’t do rotations, so the first semester and a half was just classes, which were mostly review
 - In hindsight, I probably would have dropped out of graduate school without this “break”

So, HOW DID I GO FROM BEING A SCIENTIST TO WORKING AS A CONTRACTOR?

- **Academe, the wheels come off**
 - In graduate school, I worked a lot of hours in the lab and some of the experiments didn't go so well
 - Was caught in cloning hell for a while
 - When things are going well, I find that you don't question what you're doing as much as you do when things are going poorly
 - I learned a lot about myself:
 1. I wasn't motivated by the basic question I was researching
 2. I wasn't satisfied spending years learning as much as possible about one small component of the immune system
 - Had I been more introspective, I would have realized that I was a person that liked to learn a little about a lot, not a lot about a little

So, HOW DID I GO FROM BEING A SCIENTIST TO WORKING AS A CONTRACTOR?

- **So, I tried to determine what you could do as a scientist that didn't involve working on the bench**
 - I didn't find much at first
- **So I thought about what I would "like to do"**
 - I realized that I always enjoyed reading about military history and the intersection of technology and the military
 - I wrote a senior paper on the chemistry of chemical weapons
 - I figured there MUST be jobs related to that, but didn't really find any information about them

So, HOW DID I GO FROM BEING A SCIENTIST TO WORKING AS A CONTRACTOR?

- **Building an expertise in a field of interest**
 - I began to read up on a topic that lies at the intersection of the life sciences and military history: biological warfare
 - I figured that if you read two books on any topic, you know more about that topic than 99% of the public
 - If you read 10 books on the topic, then you truly could be called an expert
 - I began to attend talks and meetings on disarmament and defense held at nearby universities
 - Built a network of colleagues
 - After learning a lot about this topic, I began to find some areas that were not discussed in the literature
 - I independently wrote a manuscript and got it published in a peer reviewed journal

So, HOW DID I GO FROM BEING A SCIENTIST TO WORKING AS A CONTRACTOR?

- **Leaving academe**
 - When I graduated, I had NO IDEA what I was going to do next
 - I tried ginning up businesses by sending out a pitch to various organizations that I thought needed help in this field
 - Nothing came of it
 - This is not how business is done in this field
- **Luckily (for my wallet), I was approached by a colleague who was working in a startup**
 - I agreed to join if I could still work one day a week on pursuing my own path and to continue to network
 - Also was put in charge of grantwriting for the company
 - Taught me more about how the government funds projects and how to pitch an idea
 - During this time, I devised and sold a study to the defense department as a sole researcher
 - Followed the process of invention
 - This idea was pitched to several colleagues until I found one that could fund the study

So, HOW DID I GO FROM BEING A SCIENTIST TO WORKING AS A CONTRACTOR?

- **The United Nations**
 - Because of the network I had built up, I was recruited to be trained as a biological weapons inspector
 - It was a cold call from the state department
 - Other colleagues of mine were asked first but were unwilling to serve for a variety of reasons
 - Not the least of which is that there was no sign that inspections would occur again
 - They named me as a replacement
 - I was accepted by the UN and did the training, thinking that it would never be used
 - Then 9/11 happened and the administration somehow became interested in Iraq
 - Because of my technical background, I was asked to serve in Iraq
 - I was there for 3 months, I performed about 60 inspections, ran the bio lab and wrote the technical reports to the Executive Chairman

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- **Abt Associates**
 - Before leaving for Iraq, I was recruited by a mid-sized government contracting organization to head up a homeland security department
 - The head of the company had read an article I published in Scientific American on the topic and cold called me
 - Abt largely performs research and consulting in the social sciences and they wanted me to develop a "hard" sciences practice
 - I learned a lot about the rules of government contracting from my colleagues
 - I met several potential government clients and pitched them ideas
 - But I found I was building a small company inside of a large company
 - I couldn't really leverage the expertise at the company in anything more than a general way
 - Being in a large company, I had to support a lot of overhead and deal with a sizeable beaurocracy

SO, HOW DID I GO FROM BEING A SCIENTIST TO WORKING AS A CONTRACTOR?

- **Gryphon Scientific**
 - I decided to start my own company
 - Could take eliminate elements of the beaurocracy that didn't suit our needs
 - Could eliminate costs by being small
 - Could take advantage of incentives the government offers to work with small businesses

TELL ME MORE ABOUT GRYPHON

- **Started in March 2005**
- **Started in my house, now we have 10,000 sqft of office space**
- **Annual revenues: from \$300K to over \$10M for 2016**
- **We don't "make anything", we provide advice, guidance and problem solving**
 - Well, we make Power Point and Word documents
- **Our clients:**
 - The Department of Health and Human Services
 - The Department of Homeland Security
 - The National Institutes of Health
 - The Department of Defense
 - National Laboratories

THE TYPE OF WORK WE DO

- **Issue facing policy-makers:**
 - In the aftermath of a disaster many types of medical resources will be needed in quantity, which should the government buy to support disaster response?
 - Most recently: how many beds do medical shelters need to provide for victims of hurricanes and earthquakes
- **How we help:**
 - Model the effect of disasters on the US population
 - Based on biomedical, chemical and physical data
 - Estimate the types of injuries experienced by victims
 - Calculate the medical resources needed by each victim over time and sum those up across all victims
 - Compare the need to the amount possessed or easily obtainable by the affected jurisdiction
 - Determine the effect on victim outcome by lacking enough of particular supplies
 - Compare the cost of the supplies (purchase, maintenance and use) vs. the effect on patient outcome to identify those that should be bought first

THE TYPE OF WORK WE DO

- **Issue facing policy-makers:**
 - Currently, inspectors at US ports try to identify cargoes harboring plant pests by visual inspection
 - There are hundreds of plant pests including insects, snails, worms, weeds, bacteria, fungi and viruses
 - An inspector cannot visually inspect all cargo entering the US and cannot keep the signs of infestation for all cargoes in mind
- **How we help:**
 - Working with stakeholders, we can determine how a new technology must perform to enhance the normal workflow at a port
 - By analyzing existing technology, we identify which types of technology may provide needed capabilities when incorporated into the workflow
 - By determining performance requirements, we can set goals for technology developers to meet
 - Notionally: Must detect 30 insect pests with a false alarm rate of no more than 1% and be no bigger than a flashlight

THE TYPE OF WORK WE DO

- **Issue facing policy-makers:**
 - We currently have controls to prevent the acquisition of dangerous pathogens by those who may not handle them responsibly
 - A few years ago, a few academic groups have created viruses de novo by ordering 40nt chunks of their genomes, stitching these chunks together and using cells
 - Now, DNA pieces can be made to order in 50Kb chunks
 - The government realized that we have no controls over who can order the "building blocks" of viruses
 - How can the risk of misuse of the synthetic DNA industry while not hampering scientific progress or economically harming the industry?

THE TYPE OF WORK WE DO

- **How we help:**
 - We interviewed companies that make these products to understand their ordering processes, economic constraints, current safeguards and customer needs
 - We interviewed scientists who use these products to determine their requirements for quality, confidentiality, cost and speed of delivery
 - We determined which products posed the most risk of misuse by understanding the process of making viruses de novo
 - We investigated other mechanisms the government uses to control potentially dangerous items with scientific uses
 - We investigated technology that could be used to screen potential customers and their orders
 - We then designed a system that reduces the risk while satisfying as many industry and customer demands as possible

QUALITIES OF SUCCESSFUL SCIENTISTS WHO WORK IN OUR FIELD

- **Must be comfortable and adept at writing**
 - 90% of your findings are communicated by writing
 - You cannot always rely on charts to make your point
- **Must understand how science influences the world**
 - What are the biggest scientific issues facing the world today?
 - Why are “obvious” scientific solutions not being taken?
- **Must be willing to learn about new fields and then move on**
 - No academic freedom
 - Must leave some questions unanswered
 - Good news: your job changes A LOT
- **Knowledge must encompass more than your thesis**
 - Must be conversant in more than biology
 - Cannot be afraid of math
 - Must be capable of creative problem solving

LESSONS LEARNED

- **Become an expert in more than one topic**
 - While getting a formal education, take advantage of other resources to also become conversant with the language and issues of another topic
 - This sounds daunting, but can be done by reading articles and several books on a single topic
 - Read the Economist
- **Generate a “tool box” of experts in industries, methods and topics**
 - A small consulting company cannot hire all the experts it may need to succeed in the types of fields it has to work, build a network of people who are experts in a variety of fields to use as consultants as needed
- **Don't be afraid to fail**
 - Most things worth doing are difficult, so try it.
 - Just make sure you have a safety net.
- **Write it down**
 - Disseminating a publication (such as a journal article) while networking is an effective way to convince those you meet that you have something valuable to say
 - Helps if it is peer reviewed

LESSONS LEARNED

- **Be inventive**
 - Much of our initial work was on projects that the government didn't know they needed.
 - We presented them with a statement explaining why they needed our research and why they could not do their jobs well without our answers.
 - By presenting your clients with a proposal that no one else has pitched, you eliminate the competition
- **Network**
 - Take business cards and write down some facts about the person on the card, especially their responsibilities in their job
 - Go to meetings on the topics you want to work on
 - Follow up with your colleagues with ideas for projects and publications
- **Don't go it alone early**
 - Success in many business is about connections, work for someone else until you've developed a personal network that can be the basis of your initial business

QUESTIONS?

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