**HOW YOU MIGHT GO ABOUT GETTING FUNDED BY DTRA**

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**Presentation at UW by Dr. Viktoria Greanya (Autumn 2012)**

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DTRA: Defense Threat Reduction Agency

(Distinguished from DARPA: Defense Advanced Research Projects Agency)

**THE AGENCY’S MISSION:**

The goal is “technological surprise” as a means of technological superiority.

Program managers do not last long at DTRA – the idea is to constantly get new ideas.

Goal: “Safeguard the U.S. and allies from weapons of mass destruction”

DTRA’s client is the soldier in the field. The emphasis is how to make life easier and better for soldiers in the field.

**PERSONAL RELATIONSHIPS MATTER; TIMELINE**

DTRA has huge, “broad agency announcements, or BAA’s, which are found at www.dtra.mil/research.aspx. Any specific topic call that goes out is an “amendment”.

You should meet with managers 1-on-1 before submitting a proposal. Funding priorities are set by the program managers, and in order to get funded, you should know the managers and what excites them. Each program manager will have a different level of risk that she/he wants to see. You must have a champion within the agency in order to be funded. When you talk to the program manager, put your ideas in writing on 1-2 slides, and make your point clear. Since program managers travel frequently, it can be difficult to get in touch with them.

How do you contact a program manager? This can be challenging, because DTRA does not publish the names of program managers online! However, the organizational structure is likely to be on the DTRA website, and from there you can google “chief DTRA such-and-such-division” and probably find the right name. All DTRA e-mail addresses are of the form firstname.lastname@DTRA.mil. The program officer for basic research is jonathan.kaufman@DTRA.mil.

Within the sub-field of chem/bio, DTRA holds a yearly chem/bio conference and the topic sessions that they lead are the areas of interest to the program managers. To search for a conference in your field, google “YourTopic Army Research Conference”.

Establishing a relationship with a project manager is especially important because the timeline from funding announcement to application deadline is tight, typically only 4 weeks (which is really closer to 3 weeks if you count internal UW deadlines, and which assumes that you see the announcement on the very day that it is posted). The first application is typically short, as in a whitepaper.

Dealing with the DOD is different from the NSF and other agencies in that program managers have direct control in some way or another on the level of science that gets done.

**HOW ARE CALLS FOR PROPOSALS DEVELOPED?**

* Program managers talk with scientists.
* Ask the Heilmeier Questions, which are:
1. What are you trying to do? Articulate your objectives without jargon.

2) How is it done today, and what are the limits of current practice?

3) What's new in your approach and why do you think it will be successful?

1. Who cares?

5) If you're successful, what difference will it make?

6) What are the risks and the payoffs?

7) How much will it cost?

1. How long will it take?

9) What are the midterm and final "exams" to check for success?

* Program managers allocate funding for the call through core program funds if there is already a recognized area of need and interest.
* Or they begin funding small effort(s) to answer key questions (SEED).
* Or they pitch a new idea: Focused Innovative Technology (FIT) program.
* Once it has been decided that a new area will be funded, the process from announcement to funding typically takes between 1 year and 18 months:

1) Announce program and accept abstracts within 30 days

1. Review abstracts and invite selected investigators to submit full proposals
2. Full proposals (~50 pages) are due within 30 days
3. A short list of grantees is assembled.

**PITCH INNOVATIVE PROJECTS THAT MIGHT NOT BE FUNDED ELSEWHERE:**

1. You want to convince the project manager that your project is sexy.
2. A wacky project might be O.K. – they have funded some wacky projects.
3. Beyond answering the Heilmeier questions above, you should answer what the potential DoD impact is.

**SUBFIELDS WITHIN DR. GREANYA’S GROUP:**

CHEM – guarding against chemical warfare agents

BIO – guarding against biological threats, emerging diseases

Within the field of Chemical and Biological Technologies are…

1. Translational medicine (and its subfields)
2. Information systems capability (and its subfields)
3. Advanced Emerging Threat (and its subfields)
4. Detection / Diagnostic Disease Surveillance (and its subfields)
5. Physical Sciences and Technology
6. Protection / Hazard Mitigation
7. Advanced Technology Demonstration
8. Materials and Imaging 🡨 This is where Dr. Greanya’s projects are.

**EXAMPLES OF PROJECTS WITHIN THE RUBRIC OF NANOMATERIALS:**

1. Dynamic multifunctional materials for a second skin (how to make a uniform)
2. Air filtration – selective absorption of volatile organics (facemasks and air filtration systems)
3. Designer functionalities of materials (Design specific functionalities rather than relying on what is available currently). This group funds David Baker.
4. Transport on surfaces. When something hits a surface, how will it travel to a sensor/analyte, etc.?
5. Sensors, including label-free biosensing
6. Nanomaterials interacting with the body (Nanostructured Active Therapeutic Vehicles). How do nanoparticles agglomerate in the body? Do they become toxic? How would one prophylactically treat organic nerve agents? This requires understanding biotic/abiotic interfaces.

**Specific example:** Developing nanostructured material vehicles which are capable of active detection of insult, and which release a payload of therapeutics, and which circulate in vivo. The list of requirements is long: oral application, programmable, long-duration circulation in the bloodstream. Two thrusts are in the areas of small molecule antibiotics and butyrylcholinesterase.

*(Private comment from Sarah: Any one of these attributes or requirements is challenging – some have been attempted for many years now. Viewed most positively, any proposal that promised to deliver on all of these attributes would be reflect thinking outside of the box, and would be innovative. Viewed most negatively, it would be bullshitting, promising progress on something that cannot be delivered in a short time. Requesting funding from DTRA seems to not be for the faint of heart. Bold statements that cross the line of standard scientific modesty may be required. It would be good not to be conservative. DTRA is looking for breakthroughs.)*

**POSSIBLE IDEAS FOR FUTURE FUNDING THROUGH DR. GREANYA’S PROGRAMS:**

* Biosensors
	+ Biodegradable, energy-harvesting “smart dust” – distributed sensor systems. The idea is to blanket an area with tiny sensors.
	+ Bio-inspirted photonic systems for improved sensitivity and selectivity in sensor platforms
* Basic Sciences
	+ Novel Imaging techniques, e.g. SEM/TEM for live systems
	+ Bio-inspired fabrication of complex structures
* Materials for medical applications
	+ Plasma wound healing and wound decontamination
	+ Microneedles that conquer challenges of dosage limitations and size of bandages. Need applications that are shelf-stable and self-implementable (a soldier can apply it him/herself).
* Imaging
	+ Minimally-invasive neural imaging
	+ Field-deployable imaging that is usually only in hospitals (e.g. MRI)

**DR. GREANYA’S BIOPHOTONICS INTERESTS:**

* Examples: pretty butterfly pictures, cornea in eyeballs, adaptive color in squid, etc.
* How to make an adaptive lens and retina? Our eyes have “grin” (graded index of refraction) lenses, which use very stiff materials. Are there other materials that can bend?
* Compound eyes: small length scale and able to sense UV
* Gradient-Index arrays: cone-shaped arrays in moth eyes. At the interface, the index of refraction of the material is closer to that of air. Also, the material is hydrophobic, so droplets do not form on it and ruin the imaging capabilities.
* Structural color (e.g. the Morpho butterfly)
* Dynamic color: animals’ ability to change color under different conditions. Applications in camouflage, displays, multifunctional coatings

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