Investigating DARPA’s fearless exploration and dissemination of new medical technologies and medical research ethics
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Introduction and acknowledgements

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My current areas of research and publication include online discourse communities, knowledge dissemination and popularization, military discourse, Corpus Assisted Discourse Studies, workplace communication, distance learning, English for specific purposes.

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DARPA (Defense Advanced Research Projects Agency)

• Military environment as starting point for scientific and medical research on ethics and bioethics

• Since 1957: DARPA as the site and source of progress in science and technology initially more specific and task-oriented in battle and military medicine but also implemented in civilian context (e.g. Siri, GPS, internet, Roomba)

• Specific requirements and peculiarities of military medicine and the military medical profession (team-based, secure, focused on readiness and preparedness, timely, based on limited resources and medical competence) (Sessums et al. 2009)
DARPA (Defense Advanced Research Projects Agency)

• Opposing tendencies:

1. Reluctance to discuss social and ethical issues concerning certain fields of study (e.g. neurosciences) and national security (Moreno 2006)

2. Avoidance of mistrust of the public which would “undermine military recruitment, retention, funding or otherwise interfere with the mission of the military” (Mehlman 2015: 411)

• Same ethical and bioethical controversies as medical research and need to address civilian societal issues and concerns (Howe 2003; Miles 2013; Parasidis 2015)

• Result: official website https://www.darpa.mil/ aiming at knowledge dissemination and collaboration with various subjects (universities, industries, small businesses, the government, the public and the media)
Texts selection and analysis (in progress)

• Relevant sections of DARPA website: About Us, Our Research, Fundamental Research, Ethics & Societal Implications

• 2019 DARPA Strategic Framework


• “Voices from DARPA” podcast episodes (https://blubrry.com/voices_from_darpa/): 29 episodes, 6 of which (after interruption) following Co-vid emergency
Aim and research questions

• R1: How does DARPA frame its mission to the public in terms of medical research ethics and address societal questions or issues?

• R2: How does DARPA adopt and adapt traditional academic research writing genres and texts to propose research programs and opportunities and communicate their results?

• R3: Which linguistic and discursive strategies are applied to disseminate highly specialized information and refer to ethically controversial issues?
Methodological framework

- Genre analysis (Swales 1990, 2016; Hyland 2004, 2010) for observations and comparisons on a macro-textual level

- Corpus Assisted Discourse Studies (Partington 2004; Baker 2006; Degano 2006; Evangelisti Allori 2011) for lexical and discursive choices

1. Critical Discourse Analysis (Fairclough 1995; Schiffrin, Tannen and Hamilton 2001)
2. Corpus Analysis: AntConc 3.5.8. (Anthony 2019) for integration through relevant occurrences and collocations
R1 (in progress): Fearlessness

Because DARPA’s programs push the leading edge of technology, they are sometimes society’s first notable encounter with the societal dilemmas associated with new capabilities. DARPA pursues these technologies because of their promise, and the Agency is committed to exploring domains that could leave the Nation vulnerable if not pursued. […]

In dealing with issues such as these, DARPA’s job is twofold: First, the Agency must be fearless about exploring new technologies and their capabilities; this is DARPA’s core function, and the Nation is best served if DARPA pushes critical frontiers ahead of its adversaries. At the same time, DARPA is committed to addressing the broader societal questions raised by its work and engaging those in relevant communities of expertise to provide context and perspective for consideration. […] In new and uncharted territory, the Agency engages a variety of experts and stakeholders with varying points of view—both to hear what they and their professional communities of practice have to say and to help convey to those communities DARPA’s insights about what technology can and cannot do.

Societal consensus on difficult questions of technology and policy is notoriously difficult to achieve. And while new technologies can help defuse previously polarizing issues […] it is important to recognize that technological advances are bound to keep generating new societal quandaries, and that resolving them will demand broad community engagement. (Ethics & Societal Implications)
R1 (in progress): Fearlessness

• “Fearfulness”: pioneering but also unapologetic

• Priority: research and nation security (military application), afterwards society and ethics (and possible civilian use at their discretion)

• Ethical questions: an inevitable consequence of science and progress that however must not stop or hinder the institution’s activity
R2/3 (in progress): appropriation of academic genres and languages

- “Our research” section (including archive) = short research proposal writing + popularisation (acronym + authorativeness/proximity in images Hyland 2010 + promotional/illustrative language)

**Bioelectronics for Tissue Regeneration (BETR)**

*Dr. Paul Sheehan*

*The Bioelectronics for Tissue Regeneration (BETR) program will develop technology aimed at speeding warfighter recovery, and thus resilience, by directly intervening in wound healing. To do this, researchers will build an adaptive system that uses actuators to biochemically or biophysically stimulate tissue, sensors to track the body’s complex response to that stimulation, and adaptive learning algorithms to integrate sensor data and decise intervention to the actuators. After establishing this closed-loop control over physiological processes, BETR researchers will integrate these devices into a single platform that guides the tissue in real time along an optimal growth pathway. Ultimately, through the BETR program DARPA aims to provide medical interventions with the necessary sophistication to move quickly restore complex human tissues after injury. The effort notably focuses on injuries relevant to the warfighter such as blast and burn damage to bone, skin, and nerves. If the program succeeds, warfighters could return to duty sooner and more fully healed.*

**Epigenetic CHaracterization and Observation (ECHO)**

*Dr. Eric Van Gieson*

*The Epigenetic Characterization and Observation (ECHO) program aims to diminish the threat posed by weapons of mass destruction (WMD). To do this, the program is building a man-portable device that analyzes an individual’s epigenetic “fingerprint” to potentially reveal a detailed history of that individual’s exposure to WMD or their precursors. DARPA envisions that the same technology could provide rapid diagnostics for troops who may have been exposed to threat agents or who may be suffering from infections, providing a timely signal to apply effective medical countermeasures.*

*ECHO technology would work by quickly reading an individual’s epigenome — a part of human biology that helps our body respond to the constantly changing environment.*
Conclusions (tentative)

- DARPA’s approach to aims and scope of research differs from that of other institutions in relation to their focus on ethical questions in terms of research and experimentation.

- To justify such an approach, it makes extensive use of visual, textual and audio knowledge dissemination strategies and channels, as well as of academic genres in order to confer structure and credibility within the scientific community.
Future directions

- Possible changes in the framing, length and linguistic focus of research ethics and proposals in wake of the Co-vid emergency

- Comparison with representation of DARPA research in the (online and/or print) media
References