

Implicit Requirements: Dark Matter of the Research Solicitation

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While dark matter may remain largely a mystery in astrophysics, requiring its existence and properties to be inferred rather than directly observed, the existence of the proposal dark matter equivalent, i.e., **implicit requirements in the research solicitation**, is somewhat better understood, at least by successful proposal authors. By comparison, the **explicit requirements in a solicitation** are those accessible to anyone who reads the document with sufficient attention to get a clear understanding of the agency's research goals and objectives as well as the review criteria used to evaluate proposals.

Implicit requirements are something else entirely. While they are not clearly stated in the solicitation and are at best alluded to indirectly, **they are often one of the key factors in determining whether a proposal is funded or declined**. Explicit requirements are stated in "black and white," "plain as day," in the solicitation, whereas implicit requirements may be suggested by the explicit requirements in the solicitation, **but are often entirely dependent on the reader to decode them**.

In short, **implicit requirements reveal themselves only to the informed reader**. This reader brings to the solicitation **prior knowledge** of the agency, particularly its mission, culture, investment priorities, recent funding history, and role of program officers in the funding decision, as well as insight into what characterizes a competitive research narrative at various scales, such as directorates, divisions and programs at NSF. **As in the case of dark matter, the implicit requirements of a solicitation must be inferred rather than directly observed**. How well the implicit requirements in a solicitation are decoded, understood, and addressed in the research narrative is largely dependent on the author's prior experience.

For example, the author of a research narrative written for NSF will note in the solicitation that Broader Impacts (BI) will play a role in the review process. However, the solicitation may only **explicitly note** that NSF has two core review criteria, one of which is briefly and simply stated without elaboration: "**Broader Impacts: The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.**" In fact, the Broader Impacts Criterion, like dark matter, often remains largely a mystery to many PIs, particularly those new to NSF.

For instance, left unstated to various degrees in NSF solicitations, but nonetheless enormously significant to a successful proposal, is the large body of knowledge about successful BI models that could help inform a better reading of an NSF solicitation. The point here is that prior BI knowledge brought to the reading of an NSF solicitation allows a much deeper and more nuanced insight to NSF's expectations not otherwise possible from a "**tabula rasa**" reading of the solicitation, and hence offers a significant competitive advantage in terms of writing a research narrative that most closely fits agency expectations.

Moreover, when responding to a DOD solicitation, including agencies such as ONR, ARO, AFOSR, and DARPA, the **implicit** understanding of the solicitation may far outweigh the **explicit**

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understanding. For example, both the *FY 2016 DOD Multidisciplinary University Research Initiative* (MURI) and *DOD FY 2016 Defense University Research Instrumentation Program* (DURIP) have white paper due dates in September. But what is implicit rather than clearly explicit, particularly to DOD newcomers, in both the MURI and DURIP, is the degree to which a history of prior DOD funding and a relationship with a program officer will heavily influence the funding decision. Similarly, an implicit understanding rather than a clearly stated understanding of the important role played at DOE and the national labs of program officers along with a prior relationship to them, is a critical factor in funding decisions.

While the examples of the roles of both explicit and implicit requirements in understanding funding solicitations are extensive, the bottom line is that those who plan, develop, and write proposals, or those who give advice on this process, must address both. Moreover, this points to a critical role that can be played by research professionals who, based on experience over time, become the extensive “corporate memory” for implicit requirements across a wide range of funding agencies and programs. This will prove to be important knowledge for new and junior faculty if they are to succeed in pursuing research funding.

Bottom line: the funding solicitation is not just what it appears to be—it is much more than that; or as the poet W. H. Auden once observed about funding solicitations, *“There’s always another story. There’s more than meets the eye.”*