



## 2024 Minerva Topics of Interest

Below represents the [Minerva Research Initiative](#) topics of interest for the 2024 funding competition. In framing any Minerva proposal, it is important to articulate the basic science contribution of the research proposed. It is expected that all proposals will have sufficient area and subject-matter experience to appreciate the nuances of diverse local contexts—including the (ethical) challenges posed by different value systems—and proposers are strongly encouraged to review the 2019 Future Directions in Social Science report on the [Emergence of Problem-based Interdisciplinarity](#) as a reference for the program’s strong interest in supporting projects that are disciplinarily diverse and committed to addressing problems in innovative ways. It is also expected that proposals utilize both qualitative and quantitative approaches and include validation strategies of the research findings and potential impacts. Further, the program is interested in how the theoretical and methodical approach of the proposed research is generalizable such that it could influence how similar problem sets are approached.

Successful proposals will in some clear way align with the most recent [National Defense Strategy](#). In addition, there is strong interest in research proposals partnered with Historically Black Colleges and Universities, Minority Serving Institutions, Tribal Colleges and Universities, and other appropriately diverse teams, such as Professional Military Education Institutions, especially as they contribute different perspectives on the social dynamics of the challenges posed below.

See the [complete NFO on grants.gov](#) for submission instructions.

- Topic 1: Societal Cohesion and Conflict
- Topic 2: Advancing Influence Measurement(s)
- Topic 3: Arctic at the Polar Crossroads
- Topic 4: Cultural Resilience, Climate, and Human Security in Oceania
- Topic 5: Social Impact of Technological Change
- Topic 6: Deterrence and Competition across Military and Civilian Spheres

**NB: Each proposal should be submitted to only one topic area, even if there is overlap with another topic area. White Papers are required prior to Full Proposal submission.**

**White Papers due: November 29, 2024 | Full Proposals due: February 28, 2025**

**Topic 1: Societal Cohesion and Conflict**

POC: David Montgomery, Office of the Under Secretary of Defense for Research and Engineering, [david.w.montgomery61.civ@mail.mil](mailto:david.w.montgomery61.civ@mail.mil)

The ability of a group, or society more broadly, to hold together over time is central to social life. As the nature of a social unit varies across cultures and (economic, political, social, etc.) systems, this topic seeks to understand the nuances of shifting social cohesion in the face of diverse and evolving situations of varied magnitude (size, scale, importance, etc.) While part of the concern is a question of societal resilience, a related fundamental interest is in the endogenous and exogenous factors that bring groups together/push them apart, the temporal and situational nature of group solidarity, collective memory, and the relationship between cohesion and motivation toward a stated end. A comparative focus should be given to individual and group behavior within and across different cultures and societies and how the scale of cohesion—micro-, meso-, macro-scales—influences the response and its sustainment in the face of adverse conditions. New approaches to measure social, cultural, religious, political, and economic cohesion—as well as key intermediary variables, including expectations of (self-) performance, perception of status, trust, and morale—that can utilize existing data streams or for which data can be collected with qualitative fidelity, are encouraged.

This topic seeks to develop or elaborate upon descriptive models that can be used to assess or predict societal and group cohesion, as well as analytical models that offer new insights into individual and group formation, particularly in response to events of change and influence. Approaches should employ empirical testing and explicitly consider the generalizability of findings across contexts. Particular interest will be placed on approaches that can assess the relationship between individual change in relation to group and organizational change, and vice versa. This includes not only concerns at the level of elites but also within quotidian spaces that shape human action.

Factors influencing societal and group cohesion can include change in relation to climate and environment, influence and competing characterizations of events, economics, technological change, conflict, narratives of belonging, food and water insecurity, migration, understandings of the commons, and others. As well, cohesion may be culturally, socially, politically, and economically varied. Understanding a baseline of well-being in relation to local concerns around security will be important to considering factors influencing change in different contexts at different scales (micro, meso, and macro.)

Specific foci may include, but are not limited to:

- How do we describe and measure social cohesion, degradation, adaptation, and well-being across different communities/units (including military units) and political/cultural systems?
- How do factors like well-being, inequality, status, and social division impact sociological distinctions between trust and confidence in relation to group cohesion? To what extent are relationships of cohesion within individual and group control, and what leads to breaking down or building up commitments to a particular cause?

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- What are the relationships between environmental change, food and water access, shelter, education, and labor to the performance of financial, political, religious, military, or other institutions, economic sectors, and national security? How does this affect politics, ideologies, and geopolitics, and the formal and informal social structures within and between communities?
- New understandings and approaches to governance managing the relevant Commons for desired collective outcomes in contexts of evolving needs, moral/ethical/societal norms, and population shifts.
- An understanding of the effects and after-effects of violent conflict on societal resilience.
- New insights into the relationship between conflict and “will-to-fight” at the political or national and military levels.
- How can malign activity below the level of conflict (e.g. economic pressure campaigns, information operations and disinformation, and elite capture) affect societal cohesion and resilience?
- An understanding of how social relations break down in ways that increase the risks of mass atrocity. Included here should be a dynamic understanding of the evolving dynamics (re)shaping group solidarity and locally-appropriate opportunities for intervention that might prevent/mitigate further violence. Attention should be given to the specific and generalized contexts of conflict and the challenge of intervention amid uncertainty and incomplete information.
- What are the event characteristics that bring non-cohesive groups into adherence, and what are the factors that may dissolve the union or enable them to merge into a different cohesive unit?

### **Topic 2: Advancing Influence Measurement(s)**

POC: Laura Steckman, Air Force Office of Scientific Research, [laura.steckman.1@us.af.mil](mailto:laura.steckman.1@us.af.mil)

Influence has and continues to receive increased attention in the research community yet requires additional focus to overcome current, recurring limitations. Over the past few years, especially since the pandemic, there has been a focus on developing new tools to understand what “influence” is and how to categorize it. Yet the definition remains ambiguous, which has compounded challenges for operationalization and measurement. The term has expanded across disciplines to include multiple components, with qualifiers such as social, leadership, informal, relational, personal, cultural, etc. It also occurs at various levels, such as individual, group, organizational, regional, and geopolitical. The literature also breaks down into styles and types, which can be positive or negative, and are sometimes equated with specific techniques or processes. There is also a time component, where influence can achieve short- or long-term goals over differing timespans. While these aspects contribute to understanding influence more robustly, they have led to piecemeal, sometimes siloed, interpretations on what influence is. Without a solid definition and framework, influence therefore has become something challenging to quantify.

Despite the increasing attention to influence, research approaches have often led to incremental gains. Approaches to studying influence have primarily been limited to the media, with most studies focused on digital media. Digital, especially social, media are channels that convey messages and narratives that impact people directly and indirectly. Often, the results offer correlation but rarely reveal verifiable causation. Part of this issue may be that many studies rely

on built-in social media platform metrics for measurement. While these metrics may have some value beyond some degree of engagement, they often reflect what tech entrepreneur Eric Ries coined in 2009 as “vanity metrics.” Consideration of such metrics highlights some of the current limitations and leads to two significant research gaps. The first is how to move influence research from solely considering media channels to include a more multi-vector approach. It is assumed that influence may occur across singular or multiple vectors, which could be types of information; a combination of real-world and media activity, perhaps primarily due to offline events that are amplified in various ways in the media; and/or in other ways that are not well understood. While these vectors or pathways are not fully explored, clearly there is a need to explore the incorporation of media analyses into a wider set of potential [information-]influence vectors and develop new, reliable metrics that advance a scientific understanding of influence. Such metrics must reduce the measurement gap: what must be measured to understand how influence is gained, spreads, and somehow leads to behavior or attitude change? If there is a gain in influence on one hand, is there a drop on the other? These issues are complex and require focused, nuanced research to advance related measurement(s).

Another area where influence measurement is lacking is in how to make it robust on a system (or system of systems) level. In many studies that compare influence measures, the work is done through comparing dyads or using other pairwise comparisons based on limited criteria to determine a value of influence for or with an action or partner. These partners and entities have agency to make decisions and/or take actions, which is often overlooked in these analyses, especially when moving beyond dyadic comparisons. Individuals have varying levels of influence over others and their group(s), and groups have varying levels over other individual(s), group(s), or higher level(s), each with some degree of agency. System-level information-influence measurements, where actors have different beliefs, attitudes, motivations, circumstances, and worldview are needed to move beyond dyadic or pairwise measurements. And finally, such measures require validation and clarity on what particular influence indicators signal.

This topic seeks creative approaches to developing new, more comprehensive system level information-influence measurements. It seeks transformative research ideas that address the limitations discussed above. Submissions are expected to include specific research question(s) the effort would investigate. It is anticipated that projects solely examining media, whether digital, social, and/or analog, or those using only network science methods will not be sufficient to address this topic comprehensively. There is an interest in projects that consider non-US use cases as well as those that compare two or more such cases. There is also interest in projects that consider a multi-level and/or multi-layer perspective and tackle its complexities as part of the proposed research.

### **Topic 3: Arctic at the Polar Crossroads**

POC: Laura Steckman, Air Force Office of Scientific Research, [laura.steckman.1@us.af.mil](mailto:laura.steckman.1@us.af.mil)

The Arctic continues to grow as a region of geostrategic and geopolitical importance. While relatively stable and peaceful, the region is experiencing increasing socio-economic, governmental, environmental, and international pressures in the current global order. As it adapts

to internal and external pressures, social and cultural adaptations may occur as local and global actors come to terms with the changing reality.

Human populations are fundamental actors at these crossroads. They simultaneously drive and experience effects in the region, whether these changes occur from climate change, environmental transformation, technology, or involve cultural and societal values, security, and sustainability. Such changes may be viewed differently between and among peoples/actors, depending on the circumstances and contexts involved. The presumed opening of the Arctic, as well as growing global interest in its lands and resources, will undoubtedly continue to introduce opportunities and tensions for people, traditions, and national relationships across and beyond the region.

This topic seeks research that explores the opportunities and challenges in the Arctic that stem from multiple, simultaneous realities and possible [re-]imagined futures resulting from a changing physical and ecological environment, increasing access and human activity, introduction and adoption of new technologies, and evolving strategic competition. All research proposed must be human-centered. Proposers anticipating fieldwork in indigenous territories are strongly encouraged to provide evidence in the technical narrative and/or letters of support to demonstrate local concurrence for and/or partnering in the research.

Specific areas of interest include:

- Cooperation and competition, specifically how these are understood by local and global actors with regional interests.
- Sustainability with the convergence of western and indigenous knowledge.
- Resilience and resilience-building at multiple layers.
- Maintaining national and regional stability while addressing the Arctic region's current (and future) opportunities and challenges.
- Interplay between space infrastructure, science, support, or technologies and societal change in the region.
- Techno-social implications of new technologies adopted within the region for any/all of the interests above.

#### **Topic 4: Cultural Resilience, Climate, and Human Security in Oceania**

POC: Rebecca Goolsby, Office of Naval Research, [rebecca.goolsby@navy.mil](mailto:rebecca.goolsby@navy.mil)

U.S. partner nations in the Pacific are facing enormous challenges in the next two to three decades, with rising sea levels, increased storms, and overwash events (i.e., “king tides”) dramatically affecting human security in these large ocean nations. Indigenous peoples will disproportionately be affected by climate-related crises. The disruption of ecosystems affects the availability of plants and animals upon which indigenous peoples rely for food, medicine, and cultural practices. Economic impacts on their livelihoods and income sources are also expected. Indigenous people often have deep knowledge of their environment and have been shown to develop innovative adaptation strategies. This knowledge is an important resource that is also threatened.

Many Oceanic nations can document some of the social, economic, and cultural problems that complicate their ability to develop a resilient society. In the Republic of the Marshall Islands

(RMI), for example, the current land tenure system reduces the incentive for businesses to flood proof. And differences between social classes can create tensions as families, clans, and individuals struggle with whether and when to migrate or remain. Many families ardently seek to remain, despite the growing problems they will encounter. Doing so will require cultural resilience—an ongoing process of preservation, adaptation, and innovation of cultural practices to meet the evolving context of change—strong social networks, effective leadership, and intergenerational knowledge transmission.

Many of the proposed climate mitigation projects in Oceania involve technical innovations such as the development of mesh networks, the use of drones to improve the supply of goods and equipment, including medical equipment, and the development of telemedicine capabilities. These projects could assist those seeking to remain. At the same time, technological changes will have an impact on existing social systems. Indigenous culture is deeply ingrained into the social landscape of Pacific Island cultures, including the economic systems, health care, and social networks that underpin both rural and urban areas. A greater understanding of the social systems of these nations is needed to guide technological and socio-technical projects that are intended to assist these nations in self-determination and decision-making to plan for the coming years of change.

Research is sought in the following areas:

- General studies of the cultures, languages, and social systems of Oceania, updated to consider the current crises affecting communities in Oceania. This would include the issues of land tenure, employment, health care, and other social problems affecting island communities.
- “Remain or stay”—Some leaders in RMI have asserted that they need to educate their people to become “climate navigators.” They want the population to get training, education, and guidance so that if and when they do decide to migrate, they will arrive in their new homes with the skills and resources necessary to be successful, rather than arriving as unskilled refugees requiring care. Research is needed to help further delineate what knowledge, resources, and preparations are needed to prepare migration-seekers and assist migrants in maintaining and sustaining their cultural connections.
- The role of different groups, especially women, in managing the climate crises in Oceania—Women’s role in economic development, for example, has been widely documented and their role in climate resilience is likely to be important. Differences in the roles different generations play in facilitating cultural and climate resilience is also likely to be relevant.

Cultural preservation research, especially as it pertains to language and the collection of oral histories, is likely to be part of some studies. This solicitation will promote multi-disciplinary ethnographic and social science research on the cultures and societies of Oceania relevant to cultural preservation and the significant environmental challenges that these peoples will face in the coming years. The Compacts of Free Association (COFA) nations—which include three sovereign Pacific Island nations of the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau—are of particular interest. Ethnographic field research is expected. As funds cannot be provided until an institutional IRB approval is in place, offerors

should be prepared to document that these approvals will be in place promptly or separate their field research portion into an option that could be funded separately.

### **Topic 5: Social Impact of Technological Change**

POC: Gregory Ruark, DEVCOM ARL, Army Research Office, [gregory.a.ruark.civ@army.mil](mailto:gregory.a.ruark.civ@army.mil)

Throughout history, technology has been influential in driving societal change. Most recently, this has included an evolving relationship with information, characterized by innovations that have transformed how information is transmitted, stored, and ultimately used. Advances in high-performance computing, optic networks, near-limitless digital storage, (semi-)autonomous machines, transportation of goods and ideas, artificial intelligence, etc., have impacted sociocultural, economic, political, and even the psychological understandings of social relations. The nature of society across local- to global-scales has been impacted by new networks, interdependencies, and imagined futures that both enhance and threaten existing social orders.

This topic seeks to explore the impact(s) of emerging technologies on social structures and concomitant relationships. Particularly, it is comparatively concerned with how the impact of technological change varies across different societies and across micro-, meso-, and macro-scales. It is assumed that proposals will similarly seek to understand how/if different emerging technologies lead to different categories of social impact(s) and how varied international approaches to emerging technological change may present new opportunities and risks to local-, regional-, and global-orders. Furthermore, proposals should include an appreciation of the moral and ethical implications technological change may present to different societies.

Specific areas of interest include, but are not limited to:

- The impact of changing relationships to knowledge and skill development, and the supplanting of expertise, particularly in relation to information that is heavily processed with minimal input by humans, such as artificial intelligence processing information and turning it into “knowledge” and in some contexts, decisions.
- How will institutions traditionally charged to facilitate learning evolve in societies where the construction of knowledge is no longer solely, if at all, undertaken by the human? How would institutions differ across societies?
- The impact of emerging technology on the nature and characterization of work such as organizational structure, division of labor, and what it means to be a professional.
- How has emergent technology impacted society’s relationship with it, what are new risks for individuals and groups, and what are societal impacts when competing interests arise among allies, partners, and competitors.
- How do differences in technology penetration, such as speed and intensity, effect adoption of or resistance to technology? What is the societal impact of uneven adoption rates across different scales and how does this influence perceptions of well-being.
- The impact of increased incorporation of virtual-based and fully-integrated platforms into everyday life.
- How do different approaches to Future Generation Wireless Technology and connectivity, be it centralized or decentralized, restricted or more open and collaborative, impact social relations, perceptions of security, and application/usage.

- How will technology proliferation impact known resource costs, and what are the effects on society and concomitant relationships? Likewise, how can unknown resource costs, along with societal implications, be identified?
- How does technology (current and emergent) impact competition and deterrence dynamics? Do emerging technologies pose novel risks and, if so, are new approaches to deterrence necessary to address them? How and to what extent can strengths in some domains offset weaknesses in others?
- How might the continued integration of technology, such as human-machine integration, into security structures, decision-making, and everyday life, affect the nature of peace, security, conflict, and war?

### **Topic 6: Deterrence and Competition across Military and Civilian Spheres**

POC: David Montgomery, Office of the Under Secretary of Defense for Research and Engineering, [david.w.montgomery61.civ@mail.mil](mailto:david.w.montgomery61.civ@mail.mil)

Competition and efforts to deter undesirable activities exist across multiple levels of society, and indeed is part of what regulates different aspects of social behavior. Within the national security context, the concept of deterrence has historically helped inform strategic decisions related to planning, investment, and policy. As the global environment has evolved, the concept of integrated deterrence—which is at the center of the [2022 National Defense Strategy](#) and entails working seamlessly across multiple domains, whole-of-government, theaters, the spectrum of conflict, other instruments of national power, and networks of alliances and partnerships—has become a more holistic way of considering the dynamic relationship across complex sociopolitical domains.

This topic focuses on predictive models of deterrence—including third-order effects, decision-points, and trade-offs—and/or escalation management strategies, as well as such models and strategies within a framework of strategic and economic competition. It assumes nuance in how competition and deterrence may be comparatively and cross-culturally understood, and preference will be given to proposals that empirically test such models. We are especially interested in projects that develop and implement innovative causal identification strategies or leverage new measures or data and explicitly address the generalizability of findings and the extent to which similar competition and deterrence logics are applicable across contexts and scale. Multidisciplinary approaches are expected.

Specific foci may include, but are not limited to:

- How do variations in U.S., allied, and competitor (e.g., the People’s Republic of China, Russia) decision-making processes influence the likelihood that specific actions will deter or provoke? With these variations, how and where do competitors make decisions about potential responses across the competition continuum? What signaling mechanisms are most effective at influencing outcomes and in what contexts does this change?
- Deterrence is predicated on holding valued objects at risk. What do leaders—national or within ruling coalitions—value, and how does this vary across political systems? How does this vary across micro-, meso-, and macro-levels? Are these “valued objects” conditional? How do policy tools influence these objects at risk? In what way does



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competition—economic and otherwise—impact deterrence, and does it do so differently within different socio-political systems?

- What are reliable empirical measures for whether deterrence is being sustained, strengthening, weakening, or at risk of failing? What are the best measures for decision-making? Do gain/loss asymmetry, decision making under uncertainty, or other models of economic actors affect the generalizability of competition and/or deterrence models?
- Can military and non-military (diplomatic, informational, economic, or other activities) instruments of power be used in whole or in part to produce effective deterrence? If so, does the use of military and/or non-military instruments of deterrence differ in impact, and how do the effects of one interact with the other? Do the dynamics change when one side has many options with which to deter while its competitor has few or one, e.g. force alone?
- How can whole-of-government approaches best be leveraged to de-escalate tensions while defending important interests? How do such efforts differ across political, social, and economic systems?
- What approaches can governments take to deter multiple adversaries at once? How do steps taken to deter one adversary impact deterrence of another adversary? How often do signals intended for one adversary impact the decision calculus of another (adversary, ally, or partner)? How does attempting to deter multiple adversaries affect the choice of means, strategies, and ends by the deterring power?
- New areas of research on adversarial uses of economic tools in support of national and military objectives to improve understanding of threats, vulnerabilities, and options to mitigate such threats and vulnerabilities.
- Informing the whole-of-government tools available to defend against economic coercion and manipulation activities, including the use of adversarial capital to acquire technology, real estate, or other infrastructure, or to preemptively deny access to open markets.
- New understandings of traditional nuclear deterrence theory that account for a more multi-polar nuclear threat landscape and how these relate to concepts of deterrence across other domains, including how new technologies and traditional tools of influence deter the behaviors of groups, states, and/or multiple adversaries in similar or different ways, over different periods of time.