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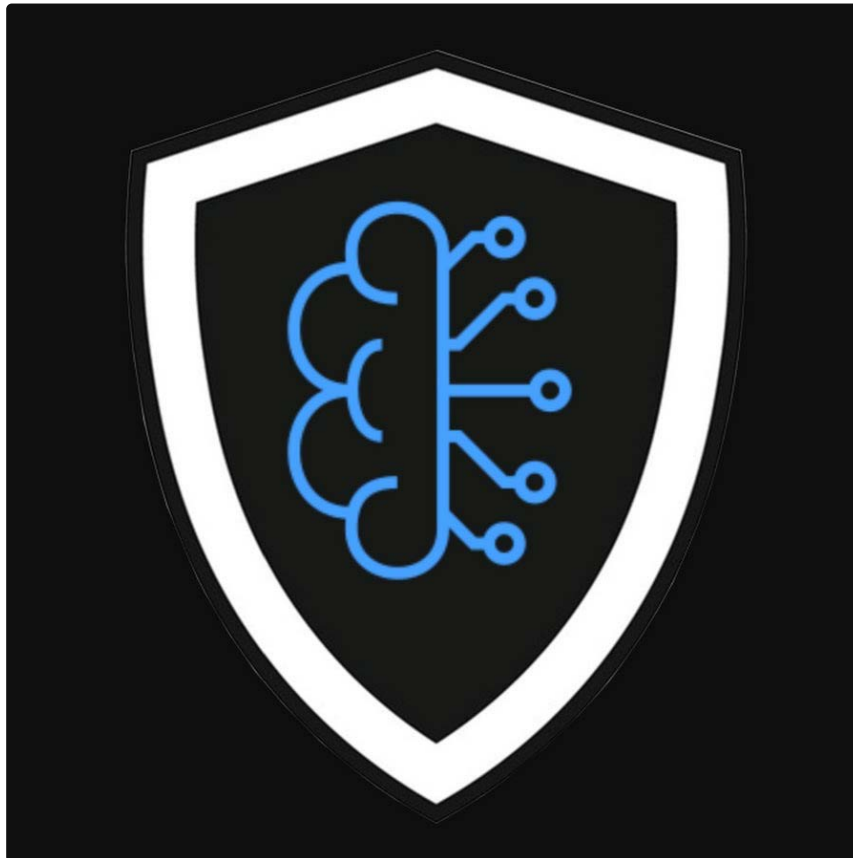


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THE DISCOURSE

The emerging armamentarium of cognitive warfare with Dr. James Giordano (Video) | CSI Talks #19

By SWJ Staff | 06:19:2026 at 11:21pm



The emerging armamentarium of cognitive warfare with Dr. James Giordano | CSI Talks #19

The Convergence Juggernaut and Dual-Use Reality

The fusion of chemical, biological, and neuro-cognitive sciences with iterative computational power creates an omnibus of capability. This intersection operates on a



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double-edged blade where the tools for precision medicine are interchangeable with those used to engineer precision pathologies. In "**The emerging armamentarium of cognitive warfare**," Dr. Giordano notes that the handle and the blade of this technology are becoming interchangeable, meaning the same systems used for care can be repurposed for harm. Modern machine learning and deep learning training algorithms now solve complex pattern recognition tasks, establishing the technical foundation for true artificial intelligence.

Neuro-Analogous Systems and the Complexity Principle

Artificial intelligence is categorized into soft AI, focused on task sophistication, and hard AI, which seeks true machine intelligence and cognition. These systems are neuro-analogous, mimicking the hierarchical structures of biological nodes and networks without requiring physical neurons. The complexity principle dictates that system efficacy depends on functional complexity, reciprocity of units, and architectural flexibility rather than sheer physical size. This allows modern technology to achieve superior results through advanced architecture, thereby shifting the focus from capacity in size to capacity in actual capability.

Geopolitical Competition and the Pace of Efficacy

A significant pace gap exists in the global competition space. Trans-pacific competitors often utilize a triple helix model that seamlessly integrates government, research, and commercial sectors to accelerate development. Technological readiness levels can reach operational status in windows as short as 120 to 160 days. Projections suggest that by 2035, China may capture over 53% of the market share in the converging sectors of chem-bio, bio-devices, and big data. This rapid advancement creates an attribution dilemma where malicious technological use is obscured behind commercial or clandestine veils, making state attribution difficult.

Risk Mitigation via the RAMP Framework

To address governance and technologically focal risks, Dr. Giordano introduces the RAMP (Risk Assessment and Mitigation Protocols) approach. This paradigm evaluates six core questions: availability, motivation, access, algorithms, mechanisms for retraction, and consequences. Ethical readiness rests on four pillars: cosmopolitan cognizance, the desiloing of national identities, pluralistic value integration, and pragmatic analysis. Security by design is required to protect the cyber-bio interface from exponential exploitation. The ultimate goal is a proactive preparedness process that balances global oversight with the unique requirements of local engagements.

Substrate Vulnerability: Neural Factors in Cognitive Security (Video)

By SWJ Staff
06.05.2026 at 05:37am

Irregular Warfare, Part One: Updating the Term and the Toolkit

By SWJ Staff
05.05.2026 at 10:59pm

VIDEO: Dr. James Giordano-The Brain is the Battlefield of the Future (& The Future is NOW)

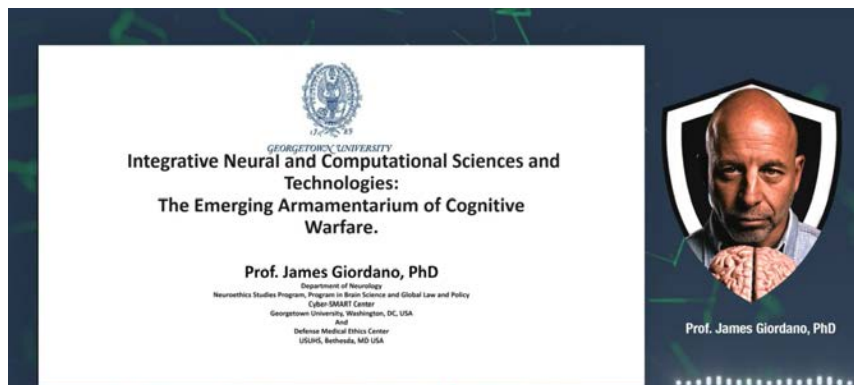
By SWJ Staff
11.13.2025 at 11:59pm

In this lecture for the Cognitive Security Institute, Dr. Giordano discusses the

weaponization of neuroscience to engage the brain as the new battle-space, and the ethical issues that arise in and from these dual use developments. **Find the slides for the lecture below.**

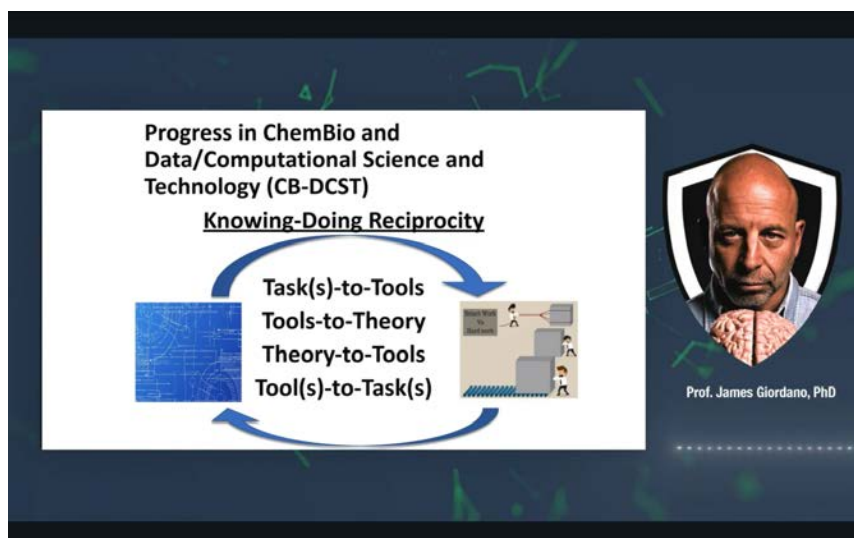
In "**Substrate Vulnerability: Neural Factors in Cognitive Security**," he discusses the neuro-biological structures and functions that can be targeted to render individuals and groups vulnerable to the tools, methods, and effects of cognitive warfare.

Dr James Giordano's decades' long work on cognitive warfare embraces a broad swath of the viable armamentarium that is usable in this domain.

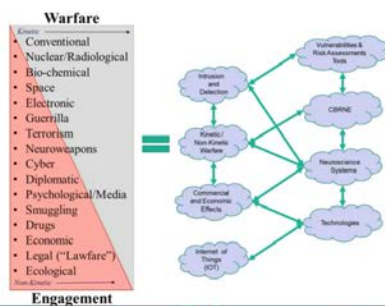


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ChemBio Agents in Conflict Hierarchy



Prof. James Giordano, PhD

Beyond BTWC/CWC: Emerging Threats in ChemBioS/T

- Synthetic Bioagents
- Modified microbes
 - CRISPR-gene-edited agents
 - "Precision" pathologies
- Nanoneurotechnologies
 - Vectorable nanomaterials
 - Aerosolizable nanomaterials/nanobots



Force Multiplied by
Integrative Scientific Convergence (ISC)



Prof. James Giordano, PhD

Integrative Scientific Convergence (ISC)

Conjoins:

- Physical sciences
- Natural sciences
- Anthro/social science(s)
- Engineering

RELIANT UPON DATA INTEGRATION, SHARING
AND USE...

BIG DATA

Validity, Veridicality, Viability, Volumes, Velocities = VALUE



Prof. James Giordano, PhD

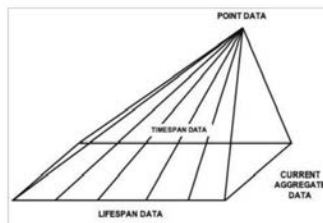
Big Data Approaches

- Maximize storage and retrieval
- Parallel computing
- Scalable, customizable
- Accessible and sharable



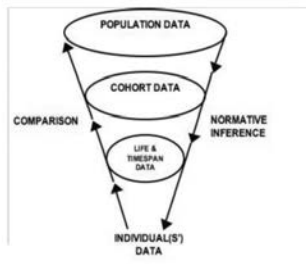
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Individual Data

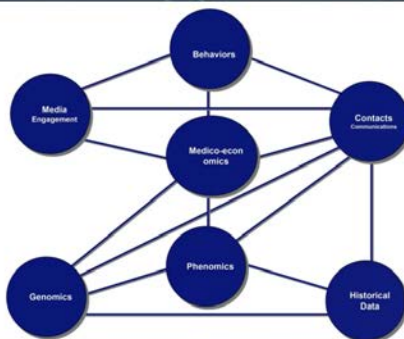


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Group-analytic Data



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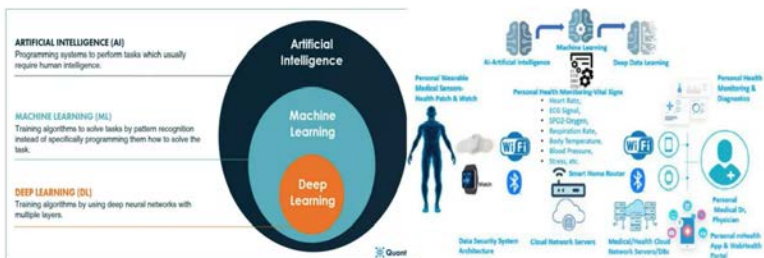
Big Data Caveats

- If it's assessable, it's accessible
- If it's tagged, it's targetable
- *If it's stackable, it's hackable*
- What's hackable is manipulable
- What's controllable is corruptible



Prof. James Giordano, PhD

Computational S/T : Tools-to-Theory-to-Tools...



Artificial Intelligence

The Two Themes of AI

- Hard AI – make computers do what humans do
- Eventually computers will think
- Soft AI – make computers more sophisticated
- Lets make computers better at solving some of our day-to-day problems



Prof. James Giordano, PhD

Human Looping and its Implications

Humans and the Loop: Stages of AI

A Loop is a system or process by which invaluable data is generated, managed and leveraged throughout an organization



IN THE LOOP

Human involvement is required for the process to occur



ON THE LOOP

Machines do the bulk of the work, Human involvement is required to ensure processes are running smoothly and to verify accuracy



OUT OF THE LOOP

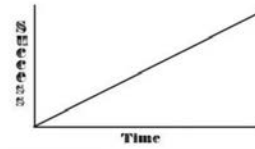
Human involvement is not required, Machines have become accurate and self-sufficient enough to continue operation independently



Prof. James Giordano, PhD

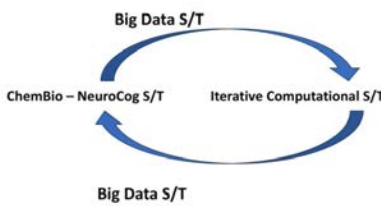
Advances in DCST

- Accuracy
- Diversity
- Scalability
- Speed
- Volume
- Workability
- Use in practice



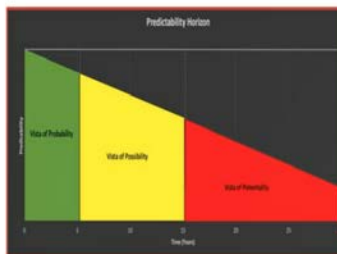
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CB-DCST Complementarity & Reciprocity



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Volumes, Velocities... and Vistas



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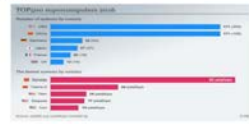
CB-DCS/T on World Stage

• Global Sight-picture 2020

- China (on pace to out spend U.S./EU by an order of magnitude over the next 10 years)
 - Predicted 60-68% increase in RDT&E by 2025
 - Predicted 50-53% market share by 2025

2025-2030 Vista

- Russia
- Iran
- North Korea
- Virtual nations
- Non-state actors



Lack of focus and commitment to cyberbiosecurity provides exponential growth opportunities for exploitation



Prof. James Giordano, PhD

Ethico-legal Issues & Risks

Technology-focal

Intersecting unknowns
Capabilities, limitations
Validity, viability of use
Runaway and Wexelblatt effects

Social

Autonomy: Of system(s) and users
Awareness, understanding, consent
Justice: Provision/access
Informed Consent for use
Dual-use



Prof. James Giordano, PhD

Core Questions and Issues

- What do we do *with* the information and capability we have?
- What do we do *about* the information and capability we don't?
- Given what *can* be done, how do we (and who will) decide upon what *should* be done?
- Will be able to do what we decide we should?



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Issues...Tensions...Conflicts *Dilemata*

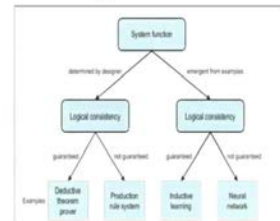
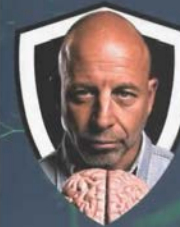
- Prevention
- Protection
- Public Health
- Privacy
- Personal Liberties/Rights
- Potentially Punitive Implications



Prof. James Giordano, PhD

CB-DCST Ethics on World Stage

- Cosmopolitan Cognizant
- Community Capable
- Accommodating pluralist
 - Needs
 - Values
 - Norms
 - Mores
- Affected by/Affecting:
 - Economics
 - Politics
 - Power Balances



Prof. James Giordano, PhD

Any Consideration of Using CB-DCST Should be Informed by...

6-W Questions:

- What S/T are available for current use?
- Why is S/T considered or advocated for use?
- Who will receive S/T?
- When will S/T be considered (algorithm/protocol)?
- Where will S/T be engaged (e.g.-locale, nation, domain, etc.)?
- Which mechanisms will be in place for ongoing provision of services/resources

As Framed by...

6-C Considerations:

- Capacities and limitations of the S/T
- Consequences incurred by S/T on individuals and systems in the short, intermediate, and long-term
- Character of the use case and user(s) affected by S/T
- Contexts of need and value that influence use of S/T
- Continuity of research and revision
- Consent for use through provision most information possible



Prof. James Giordano, PhD

The emerging armamentarium of cognitive warfare with Dr. James Giordano | C...

Globally Relevant Design

Appreciates Cultural Diversity
Cosmopolitan "Palette"



Acknowledges Local Needs/Values
Community "Canvas(es)"



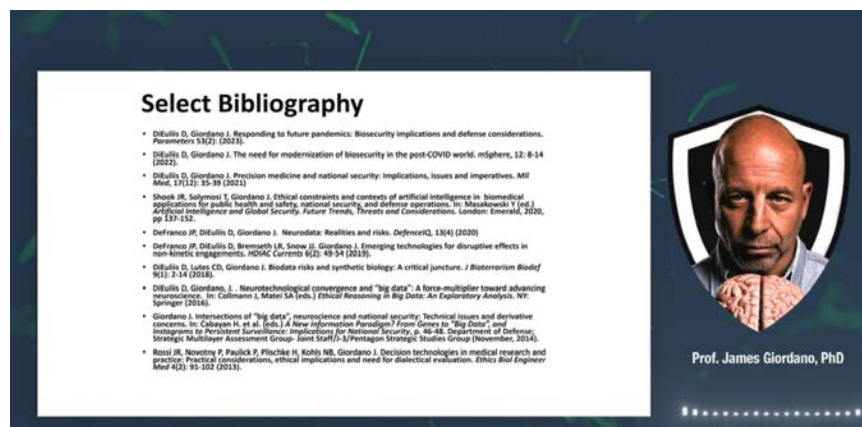
Anticipates Particularities of "Collective Efforts"
Combinatory Constructs



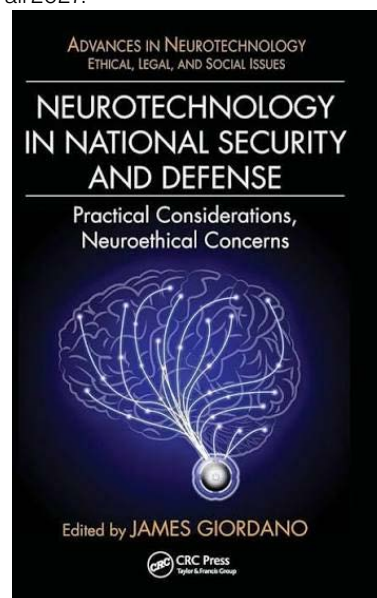
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For background information about the use of neurotechnology in intelligence and warfare, see Dr. Giordano's 2015 edited book, ***Neurotechnology in National Security and Defense: Practical Considerations, Neuroethical Concerns***, which continues to serve as the seminal volume in the field, and be sure to see the second edition, forthcoming in Fall 2027.



Tags: **Artificial Intelligence (AI)** , **Big Data** , **biodefense** , **biodeterrence** , **biosecurity** , **Chemical Weapons** , **Cognitive Domain** , **cognitive resilience** , **Cognitive Security Institute** , **Cognitive Warfare** , **CogWar** , **cybernetics** , **deep learning** , **Deterrence** , **James Giordano** , **machine learning** , **neuro-warfare** , **Neurotechnology** , **SWJ Videos**

