




# Naturalizing Jurisprudence after Generative AI


Integrating AI, Complexity Theory, and  
Legal Philosophy





# The Problem

- **Key Challenge:** Aligning AI's computational legal reasoning with human legal reasoning, which is interpretive, highly contextual, and culturally constructed.
  - Can legal reasoning be both empirically verifiable and interpretive?
- 



# Philosophical Contexts

- **Brian Leiter's Naturalism:** Legal reasoning through empirical methods.
  - Rejects “first philosophy” in favor of science.
- **Charles Taylor's Linguistic Theory:** Constitutive role of language in human experience.
  - Meaning is an emergent, dynamic process of embodied, enactive beings.



# Naturalism

- **Definition:**
  - A philosophical approach that aligns knowledge with empirical science.
  - Originates from W.V.O. Quine's "*Epistemology Naturalized*" (1969).
- "Epistemology, or the theory of knowledge, should itself be a chapter of psychology." – W.V.O. Quine.

# Key Principles:

## **1. Empirical Basis:**

1. Knowledge arises from observation and experimentation.
2. Rejects a priori reasoning as the foundation of knowledge.

## **2. Holism:**

1. Beliefs form an interconnected web.
2. Even fundamental concepts like logic and mathematics are revisable.

## **3. Integration with Science:**

1. Philosophy is continuous with scientific inquiry.
2. Understanding cognition involves studying psychology and biology.



# Leiter's Naturalism in Jurisprudence

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- Legal systems as natural phenomena:
  - Grounded in human psychological and social behavior.
- Focus on **how laws operate in practice** rather than abstract theorization.
  - Example: Judges' decisions analyzed through empirical data

# What are the goals of Leiter's Naturalism?

- Align legal reasoning with empirical science.
- Rejects a priori conceptual analysis in favor of studying real-world practices.
- Emphasizes how judges and legal systems actually function, informed by psychology and sociology.

# Naturalism and Generative AI (GAI)

How words are like a flock of birds



# Leiter's Naturalism and GAI

## Naturalism Meets Large Language Models

- **Parallel:** Leiter's critique of abstract legal theorization is open to LLMs' empirical, data-driven approach to language.
- **LLMs as Naturalistic Tools:**
  - Language is modeled as a complex adaptive system

# Introduction to LLMs and Transformers

The screenshot shows a web browser window with the URL `arxiv.org/abs/1706.03762`. At the top, a notification banner reads: **2024-09-29: arxiv.org is experiencing DB issues.** Below this is the Cornell University logo and a donation notice: "We gratefully acknowledge support from the Simons Foundation, Stockholm University, and all contributors." A search bar is visible with the text "Search..." and a dropdown menu set to "All fields". The breadcrumb navigation shows `arXiv > cs > arXiv:1706.03762`. The main content area is titled "Computer Science > Computation and Language" and includes the submission date: "[Submitted on 12 Jun 2017 (v1), last revised 2 Aug 2023 (this version, v7)]". The paper title is "Attention Is All You Need" by Ashish Vaswani, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, Llion Jones, Aidan N. Gomez, Lukasz Kaiser, and Illia Polosukhin. The abstract text describes the Transformer model's architecture and performance. On the right side, there are sections for "Access Paper:" (with links for PDF, HTML, TeX, and other formats), "Current browse context:" (showing "cs.CL" and navigation options), "References & Citations" (with links to NASA ADS, Google Scholar, and Semantic Scholar), "120 blog links", and "DBLP - CS Bibliography" (with links for listing and bibtex). A small thumbnail image of the paper's cover is visible at the bottom right.

What's New x ChatGPT x Gemini x [1706.03762] Attention Is All x New Tab x +

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[Submitted on 12 Jun 2017 (v1), last revised 2 Aug 2023 (this version, v7)]

## Attention Is All You Need

Ashish Vaswani, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, Llion Jones, Aidan N. Gomez, Lukasz Kaiser, Illia Polosukhin

The dominant sequence transduction models are based on complex recurrent or convolutional neural networks in an encoder-decoder configuration. The best performing models also connect the encoder and decoder through an attention mechanism. We propose a new simple network architecture, the Transformer, based solely on attention mechanisms, dispensing with recurrence and convolutions entirely. Experiments on two machine translation tasks show these models to be superior in quality while being more parallelizable and requiring significantly less time to train. Our model achieves 28.4 BLEU on the WMT 2014 English-to-German translation task, improving over the existing best results, including ensembles by over 2 BLEU. On the WMT 2014 English-to-French translation task, our model establishes a new single-model state-of-the-art BLEU score of 41.8 after training for 3.5 days on eight GPUs, a small fraction of the training costs of the best models from the literature. We show that the Transformer generalizes well to other tasks by applying it successfully to English constituency parsing both with large and limited training data.

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Comments: 15 pages, 5 figures

Subjects: **Computation and Language (cs.CL)**; Machine Learning (cs.LG)

Cite as: arXiv:1706.03762 [cs.CL]  
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Ashish Vaswani  
Noam Shazeer  
Niki Parmar  
Jakob Uszkoreit  
Llion Jones

# What are Complex Systems?

- Systems where global behavior emerges from local interactions.
- No central control—patterns arise dynamically from individual components



# Parisi's Analogy: Flocks of Birds

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- A flock of starlings moves as a cohesive unit without a leader.
- **Key Characteristics:**
  - **Simple Rules:** Each bird adjusts based on the movements of its nearest neighbors.
  - **Emergence:** The flock's shape, speed, and direction emerge from these interactions.
  - **Adaptability:** The flock quickly responds to threats or changes in the environment.

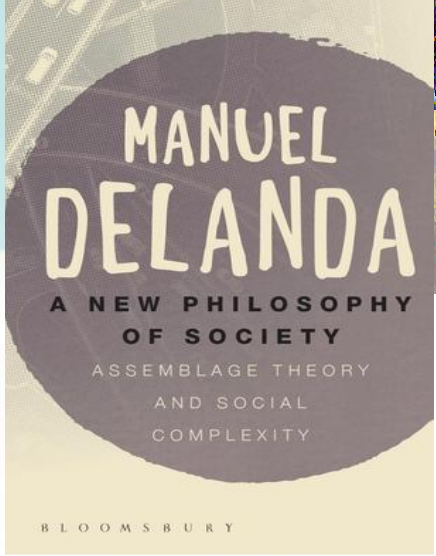
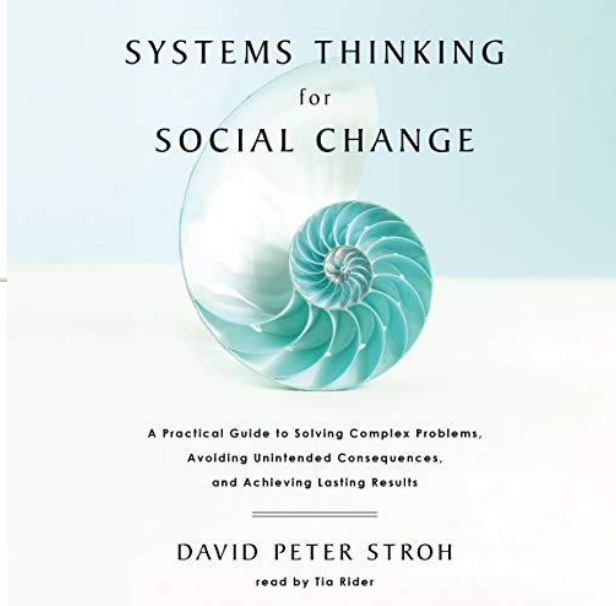
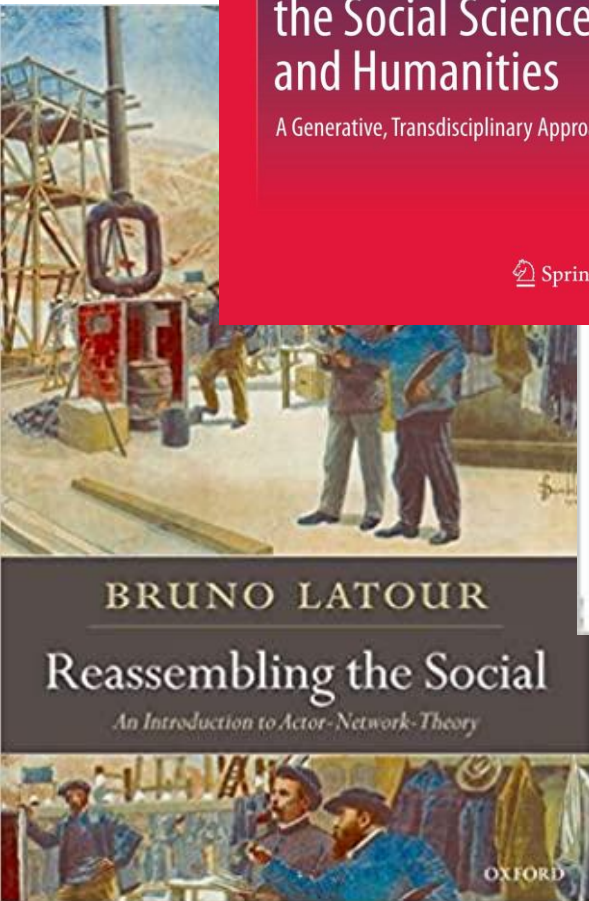
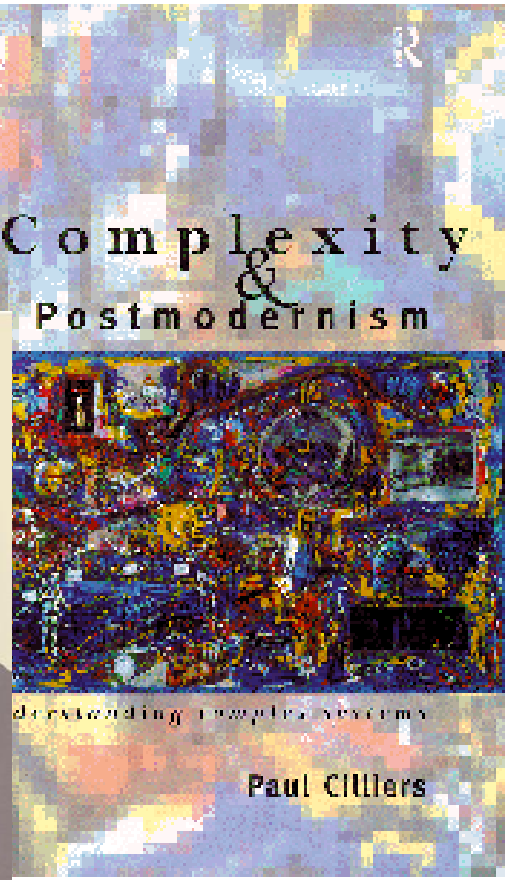
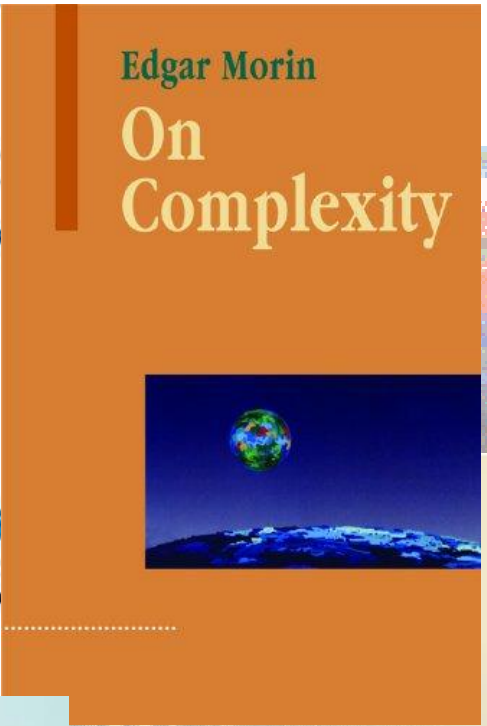
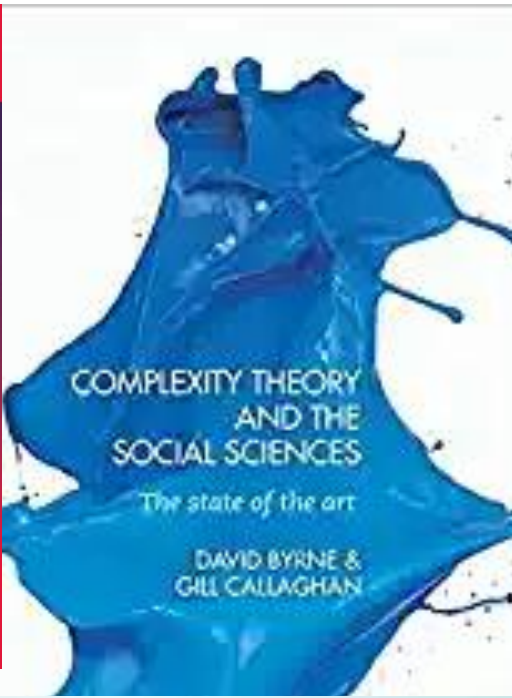
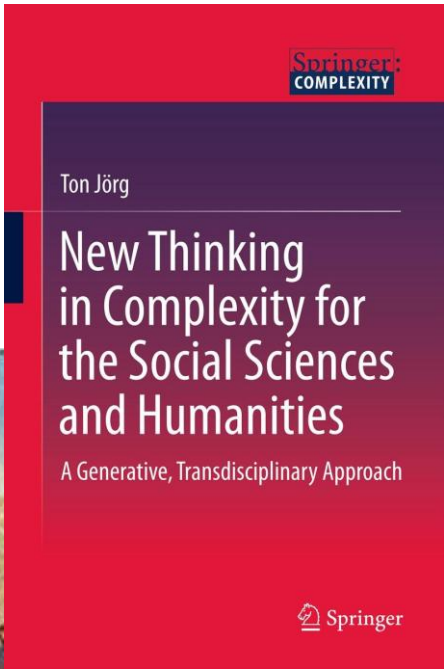


Complex system



# Complexity Theory in Social Science









# Takeaway

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Complex systems, such as flocks of birds, language, or legal systems, teach us that meaning and order can emerge dynamically without centralized rules—a key insight for developing AI in law.



# Assumptions

Meaning is emergent from the entirety of language in action.

Language use constitutes meanings that are not clear!



# Taylor's Constitutive Theory of Language

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- **Constitutive Features:** Language shapes human experience and legal meaning.
- Legal interpretation is context-dependent and dynamic.
- **Relevance for AI:** AI needs to account for this evolving, emergent legal language.



Language  
points to  
meaning  
beyond  
words.

# The Role of Large Language Models (LLMs)

- **Emergent Properties of LLMs:** Non-static understanding of language through evolving patterns.
- LLMs reflect the complexity and adaptiveness of legal language.
- **Limitations:** Cannot fully engage with human moral judgment or social practices.



# Implications for legal interpretation

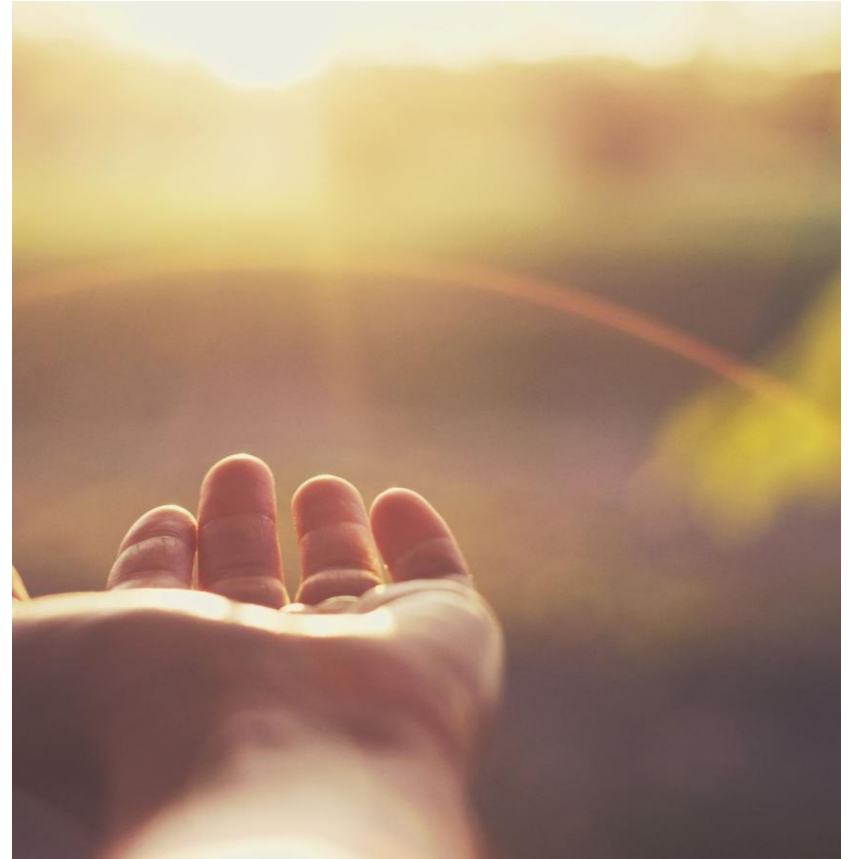
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- **Constitutive Role of Language:**
  - Language usage shapes reality, legal norms, and moral reasoning.
- **Dialogical Nature of Legal Interpretation:**
  - Legal interpretation happens through dialogue and social interaction, not static rules.
- Following a Rule requires judgment about meaning from lived experience and contextual understanding.

# Still not human

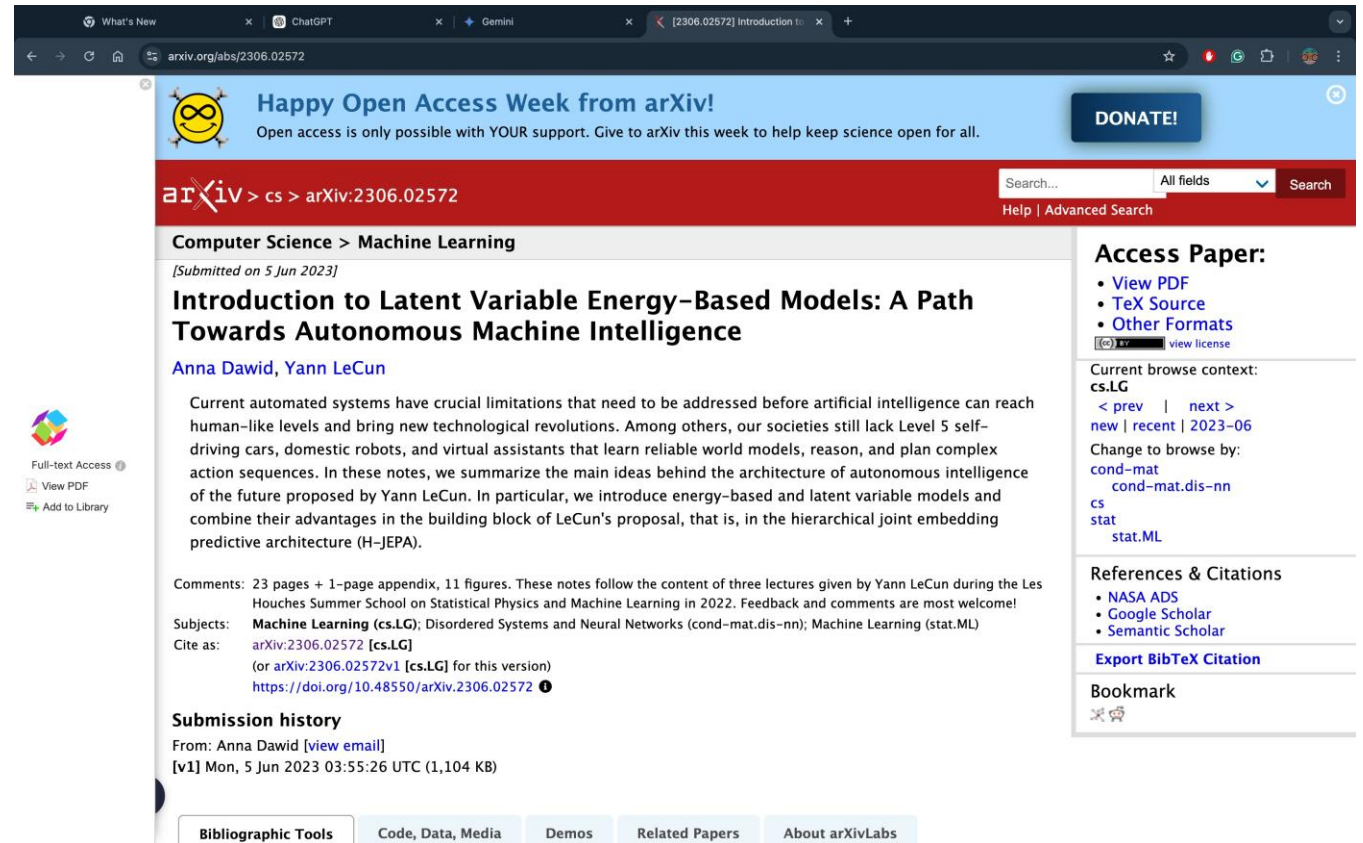
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- Human experience is not linguistic!
- It is evolved
- It is embodied
  - Often ineffable
  - Not reducible to concepts
  - Points beyond words: “Juliet is the Sun”
- Meaning emerges in human awareness in the rapidly shifting syntheses of experiences and cognitive contexts.



# Why this matters

- Computational devices will not match human reasoning without becoming human (which is probably not possible).
- It can be better, by becoming multimodal:



The screenshot shows a web browser displaying the arXiv page for the paper "Introduction to Latent Variable Energy-Based Models: A Path Towards Autonomous Machine Intelligence" by Anna Dawid and Yann LeCun. The page is part of the "Computer Science > Machine Learning" category. It features a blue banner for "Happy Open Access Week from arXiv!" with a "DONATE!" button. The paper's title is prominently displayed, along with the authors' names and the submission date of June 5, 2023. The abstract discusses the limitations of current automated systems and the authors' proposal for autonomous intelligence. The page also includes a sidebar with "Access Paper:" options (View PDF, TeX Source, Other Formats), a "Current browse context:" section with navigation links, and a "References & Citations" section with links to NASA ADS, Google Scholar, and Semantic Scholar. At the bottom, there are "Bibliographic Tools" and "About arXivLabs" links.

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## Introduction to Latent Variable Energy-Based Models: A Path Towards Autonomous Machine Intelligence

Anna Dawid, Yann LeCun

Current automated systems have crucial limitations that need to be addressed before artificial intelligence can reach human-like levels and bring new technological revolutions. Among others, our societies still lack Level 5 self-driving cars, domestic robots, and virtual assistants that learn reliable world models, reason, and plan complex action sequences. In these notes, we summarize the main ideas behind the architecture of autonomous intelligence of the future proposed by Yann LeCun. In particular, we introduce energy-based and latent variable models and combine their advantages in the building block of LeCun's proposal, that is, in the hierarchical joint embedding predictive architecture (H-JEPA).

Comments: 23 pages + 1-page appendix, 11 figures. These notes follow the content of three lectures given by Yann LeCun during the Les Houches Summer School on Statistical Physics and Machine Learning in 2022. Feedback and comments are most welcome!

Subjects: **Machine Learning (cs.LG)**; Disordered Systems and Neural Networks (cond-mat.dis-nn); Machine Learning (stat.ML)

Cite as: arXiv:2306.02572 [cs.LG]  
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# For Legal Philosophy

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- Law is evolving
- Legal terms are vague on a spectrum
- Legal systems are complex adaptive systems (like a murmuration of starlings). They can be modeled as such productively