MINDFUL AI

FOUNDATION

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Publication Record

From physical systems → computation → information → mindful machines → governance-native enterprise AI

INTELLECTUAL ROADMAP

	Phase	What the work establishes
A	**Physical & Computational Foundations**	Simulation, statistical mechanics, molecular dynamics, and the early computational treatment of complex physical systems.
B	**Software, Distributed Systems & DIME**	Objects, services, cloud systems, self-management, cognitive workflows, and distributed-system resilience.
I	**Foundations of Information & Knowledge**	Post-Turing Information Technologies, General Theory of Information, autopoiesis, knowledge processing, coherence, and the conceptual basis of Mindful AI.
II	**Mindful Machine Architecture**	Digital Genome, persistent memory, self-regulation, runtime governance, and architectures that make purpose and constraints operative.
III	**Governance-Native Enterprise AI**	Governance of commitments, causal answerability, retained human authority, security, strategy, and enterprise deployment.

A. Physical & Computational Foundations

Physical chemistry, statistical mechanics, molecular dynamics, simulation, and complex physical systems (1976–1982).

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- Rao, M., & Berne, B. J. (1981). Molecular dynamic simulation of the structure of water in the vicinity of a solvated ion. The Journal of Physical Chemistry, 85(11), 1498–1505.
- Mikkilineni, R. V., & Berne, B. J. (1982). Computer experiments on heterogeneous systems. In W. H. Marlow (Ed.), Aerosol microphysics II: Chemical physics of microparticles (Topics in Current Physics, Vol. 29, pp. 99–127). Springer.
- Rosenberg, R. O., Mikkilineni, R., & Berne, B. J. (1982). The hydrophobic effect on chain folding: The trans to gauche isomerization of n-butane in water. Journal of the American Chemical Society, 104(26), 7647–7649.

B. Software, Distributed Systems & DIME

Software engineering, object paradigms, cloud services, distributed computing, DIME networks, cognitive workflows, and self-management (1987–2018).

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- Zhu, J., Nassif, R., Goyal, P., & Mikkilineni, R. V. (1991). A perspective on objectoriented technology. In COMPCON Spring '91: Digest of Papers (pp. 546–552). IEEE.
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- Mikkilineni, R., & Sarathy, V. (2009). Cloud Computing and the Lessons from the Past. 18th IEEE WETICE Workshops, pp. 57–62.
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- Mikkilineni, R. (2014). Infusing intent and its management into Turing machine: A path to cognitive distributed computing. Advances in Research, 2(4), 207–224.
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- Messina, F., Mikkilineni, R., & Morana, G. (2015). CDCGM 2015 track report: Convergence of distributed clouds, grids and their management. In 2015 IEEE 24th WETICE Conference (pp. 47–50). IEEE.
- Mikkilineni, R., Morana, G., & Burgin, M. (2015). Oracles in software networks: A new scientific and technological approach to designing self-managing distributed computing processes. In Proceedings of ECSAW '15 (Article 11, pp. 1–8). ACM.
- Mikkilineni, R., Morana, G., & Zito, D. (2015). Cognitive application area networks: A new paradigm for distributed computing and intelligent service orchestration. In 2015 IEEE 24th WETICE Conference (pp. 51–56). IEEE.
- Burgin, M., & Mikkilineni, R. (2016). Agent technology, superrecursive algorithms, and DNA as a tool for distributed clouds and grids. In 2016 IEEE 25th WETICE Conference (pp. 89–94). IEEE.
- Burgin, M., Mikkilineni, R., & Morana, G. (2016). Intelligent organisation of semantic networks, DIME network architecture and grid automata. International Journal of Embedded Systems, 8(4), 352–366.
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- Burgin, M., & Mikkilineni, R. (2018). Cloud computing based on agent technology, superrecursive algorithms and DNA. International Journal of Grid and Utility Computing, 9(2), 193–204.
- Cammarata, G., Mikkilineni, R., Morana, G., & Nocita, R. (2018). Improving security with cognitive workflows. In L. Barolli et al. (Eds.), Advances in Internet, Data & Web Technologies (LNDECT, Vol. 17). Springer.

I. Foundations of Information & Knowledge

The conceptual transition from computation to information, knowledge, autopoiesis, cognition, and Mindful AI.

This phase corresponds to the "Foundations of Information and Knowledge" organizing principle in the review document.

- Burgin, M., Eberbach, E., & Mikkilineni, R. (2019). Cloud computing and cloud automata as a new paradigm for computation. Computer Reviews Journal, 4, 113– 134.
- Mikkilineni, R., & Morana, G. (2019). Post-Turing Information Technologies, hierarchical named networks and a new class of edge computing. In 2019 IEEE 28th WETICE Conference (pp. 82–87). IEEE.
- Mikkilineni, R., & Phalke, V. (2020). Autopoietic Computing Systems and Triadic Automata: The Theory and Practice. Advances in Computer and Communications, 1(1), 16–35.
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- Mikkilineni, R. (2020). Information processing, information networking, cognitive apparatuses and sentient software systems. Proceedings, 47(1), Article 27.
- Mikkilineni, R., & Burgin, M. (2020). Structural machines as unconventional knowledge processors. Proceedings, 47(1), Article 26.
- Burgin, M., & Mikkilineni, R. (2021). On the Autopoietic and Cognitive Behavior. EasyChair Preprint 6261.
- Burgin, M., & Mikkilineni, R. (2021). From Data Processing to Knowledge Processing: Working with Operational Schemas by Autopoietic Machines. Big Data and Cognitive Computing, 5(1), Article 13.
- Mikkilineni, R. (2022). Infusing Autopoietic and Cognitive Behaviors into Digital Automata to Improve Their Sentience, Resilience, and Intelligence. Big Data and Cognitive Computing, 6(1), Article 7.
- Mikkilineni, R. (2022). A New Class of Autopoietic and Cognitive Machines. Information, 13(1), Article 24.
- Burgin, M., & Mikkilineni, R. (2022). General Theory of Information Paves the Way to a Secure, Service-Oriented Internet Connecting People, Things, and Businesses. In 2022 11th International Congress on Advanced Applied Informatics (IIAI-AAI) (pp. 144–149). IEEE. DOI: 10.1109/IIAI-AAI55812.2022.00037.

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- Michaels, M., & Mikkilineni, R. (2025). Physics of Mindful Knowledge. Mindful AI Foundation. Available at: Mindful AI Foundation Publications.
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II. Mindful Machine Architecture

The architectural transition from theory to persistent identity, Digital Genome, runtime governance, self-regulation, and governed execution.

This phase corresponds to the "Mindful Machine Architecture" organizing principle in the review document.

- Morana, G., Mikkilineni, R., & Keshan, S. (2019). Cognitive workload management on globally interoperable network of clouds. International Journal of Grid and Utility Computing, 10(6), 586–592.
- Mikkilineni, R., Kelly, W. P., & Crawley, G. (2024). Digital Genome and SelfRegulating Distributed Software Applications with Associative Memory and EventDriven History. Computers, 13(9), Article 220.
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- Michaels, M., & Mikkilineni, R. How AI Rewrites Cause and Effect, Interchanging Machines and Humans. Mindful AI Foundation newsletter/essay. 2026

III. Governance-Native Enterprise AI

The enterprise transition from governed architecture to commitments, causal answerability, retained human authority, security, strategy, and operational governance.

This phase corresponds to the "Governance-Native Enterprise AI" organizing principle in the review document.

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- Mikkilineni, R. (2026). A Governance Native Architecture for Delegated Exercise Under Retained Human Authority. Preprints.org, doi:10.20944/preprints202607.2047.v1.
- Michaels, M., Leiblein, M., & Mikkilineni, R. As AI Gets Better, Strategy Gets Harder. Mindful AI Foundation newsletter/essay. 2026
- Hendrick, B., Michaels, M., & Mikkilineni, R. Anthropic's Security Push Exposes a Bigger Risk: Vendor Lock-In at the Governance Layer. Mindful AI Foundation newsletter/essay. 2026
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ORGANIZING PRINCIPLE

The publication record is organized as an intellectual progression rather than a chronology: foundational science and computation provide the roots; the current research program then moves from theory, to architecture, to enterprise application.

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