New and Alternative Paths to AI / TAI / AGI

SPRIND is the Federal Agency for Breakthrough Innovation in Germany. We are funding brilliant scientific and entrepreneurial teams with bold visions in all stages of the innovation spectrum - from research to products.

We are seeking teams working on new and alternative paths to Artificial Intelligence (AI), Transformative Artificial Intelligence (TAI) and Artificial General Intelligence (AGI). By "new and alternative," we mean bold, even speculative, ideas that diverge from established AI pathways such as Diffusion Models, Large Language Models and/or in general Transformer-based architectures. Our scope is intentionally broad, encompassing new hardware approaches (including embodied robotics), novel network architectures, innovative learning paradigms, and advanced methodologies for training and data efficiency. We are especially eager to support ideas that venture far from the mainstream, such as Artificial Life, Cooperative Intelligent Systems, or entirely new conceptual frameworks.

SPRIND is committed to fostering breakthroughs that reimagine what is possible in AI. If your vision challenges convention and aligns with this ethos, we want to hear from you – just send us an email or apply via our website.

The following is a non-comprehensive list of topics that might spark your interest and creativity but please bear in mind that we are totally open to other approaches as long as they fit the above-mentioned description.

1. Off the Beaten Track of Diffusion Models, Large Language Models, and Transformer-Based Architectures

Focus: Moving beyond mainstream AI approaches to explore entirely novel paradigms.

- Energy-efficient architectures that mimic biological neural systems
- Non-neural AI paradigms, such as symbolic and hybrid approaches
- AI systems inspired by quantum mechanics principles
- Automated reasoning (e.g. multi-scale reasoning, mathematical proofs)
- AI that operates on sparse, irregular, or unconventional data formats
- Memory-augmentation for long-term dependencies
- Recurrent neural architectures for efficient sequential data processing
- Continuous-time neural networks for real-world, asynchronous data streams
- Generative models that learn by simulating environments or processes
- Adaptive online learning systems for real-time knowledge updates
- Stochastic processes for novel approaches to probabilistic reasoning including Monte Carlo simulations

2. New Learning Paradigms

Focus: Rethinking how machines learn.

- Federated learning to ensure data privacy and scalability
- Alternatives to gradient-based learning
- Reinforcement learning with intrinsic motivation mechanisms
- Causal learning paradigms
- Active learning
- Synthetic data ecosystems for robust AI training
- Tap into and leverage new data modalities

3. New Hardware Approaches Including Embodied Robotics

Focus: Pioneering hardware-driven intelligence and integrated physical AI systems.

- Analog computing
- Reservoir computing
- Neuromorphic computing
- Photonic computing
- Holographic computing
- Differentiable logic gate networks
- Biohybrid systems integrating living tissues with robotics and AI
- Robotics systems with embodied cognition and adaptive learning
- Tactile and haptic feedback in AI-driven robotic platforms

4. Far-Away-from-Mainstream Ideas

Focus: Out-of-the-box approaches, such as artificial life and cooperative intelligent systems.

- Meta-Learning
- Evolutionary algorithms
- Self-assembling and self-improving AI
- Neuromodulation-inspired AI systems
- Simulation of the real world including physical, economic, social systems
- Artificial life systems mimicking emergent intelligence behaviors
- Digital organisms with emergent, life-like behavior patterns
- Cooperative AI and swarm intelligence
- Emotional intelligence in AI to enable nuanced human interactions
- Self-aware and self-reflective intelligence