

Publication

Playing Brains: The Ethical Challenges Posed by Silicon Sentience and Hybrid Intelligence in DishBrain

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The convergence of human and artificial intelligence is currently receiving considerable scholarly attention. Much debate about the resulting *Hybrid Minds* focuses on the integration of artificial intelligence into the human brain through intelligent brain-computer interfaces as they enter clinical use. In this contribution we discuss a complementary development: the integration of a functional in vitro network of human neurons into an *in silico* computing environment.

To do so, we draw on a recent experiment reporting the creation of silico-biological intelligence as a case study (Kagan et al., 2022b). In this experiment, multi-electrode arrays were plated with stem cell-derived human neurons, creating a system which the authors call *DishBrain*. By embedding the system into a virtual game-world, neural clusters were able to receive electrical input signals from the game-world and to respond appropriately with output signals from pre-assigned motor regions. Using this design, the authors demonstrate how the *DishBrain* self-organises and successfully learns to play the computer game 'Pong', exhibiting 'sentient' and intelligent behaviour in its virtual environment.

The creation of such hybrid, silico-biological intelligence raises numerous ethical challenges. Following the neuroscientific framework embraced by the authors themselves, we discuss the arising ethical challenges in the context of Karl Friston's Free Energy Principle, focusing on the risk of creating synthetic phenomenology. Following the *DishBrain*'s creator's neuroscientific assumptions, we highlight how DishBrain's design may risk bringing about artificial suffering and argue for a congruently cautious approach to such synthetic biological intelligence.

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