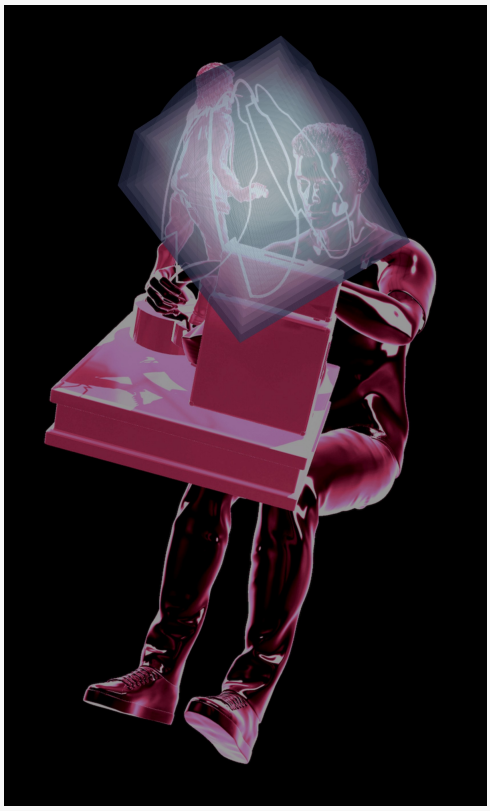
Brad Caldwell Presents Ring/Bank Theory at 2023 Science of Consciousness Conference

New theory proposes consciousness arises as filtered transients are interpreted into lower-dimensional geometry first, and then into full 3D and meaning.



Convergence of Schemas: Real (Driver), Imaginal (Music Imagery of Kobain), Shape (Bank Cube), Attention (Current Ring), and Time (Flow of Rings)

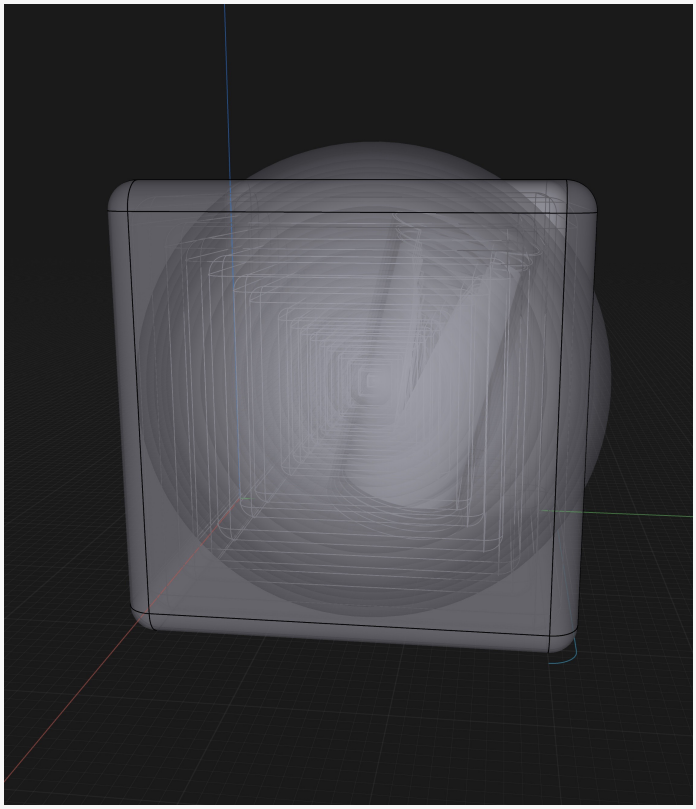
TAORMINA, MESSINA, ITALY, May 16, 2025 /EINPresswire.com/ -- At the 2023 Science of Consciousness Conference, held in beautiful Sicily, Brad Caldwell (BSCE) unveiled a novel framework for understanding consciousness, dubbed Ring/Bank Theory. Building on a simple principle—that the cortex's core function is to output useful motor transients in response to incoming sensory or cognitive transients—the theory posits that a filtered transient stream is continually interpreted into geometry.

This process unfolds in a graded fashion, beginning with raw, schema-agnostic 0–2D geometry ('ringframes'), which serve as scaffolding for the eventual construction of a full semantic 3D model. From the orientation and shape of each ringframe, the brain progressively fleshes out the surrounding 3D model of reality—or, in sleep, of a dream. Stated another way: attention begins somewhere and fills out from there. When incoming signal strength is low—as in hypnagogia, the transition between wakefulness and sleep—transients may be misinterpreted entirely, fit into the flow of ongoing internal thought rather than attributed to their real-world origin. The philosopher William James was particularly fascinated by this transitional state, where ringframe activity, according to Caldwell, may exist clearly enough to be barely noticeable. He suspects that the full interpretation, which he calls 'paint,' obscures the rendering process in normal states.

This early geometric scaffolding has been alluded to by other thinkers as well. Carl Sagan, in describing sedated states, referred to the emergence of "outlines of instant appreciation," a phrase that aligns with the model's core claim: that low-dimensional structures rapidly give rise to full experiential meaning. Caldwell's book Rings of Fire: How the Brain Makes Consciousness

lays out this theory in more detail and has garnered a mention from the Qualia Research Institute.

Caldwell has also authored a paper exploring how beta/gamma power crests in the medial prefrontal cortex may, at times, reflect the stream of filtered transients. These bursts often lock to events in music and tactile stimuli, though they occasionally ignore them entirely—suggestive of attentional gating or inattention—and may offer EEG-based evidence for the theory's proposed mechanisms.



The Bank: Geometric Schema of Raw Shape, Considered the 'Printhead of Consciousness' in Ring/Bank Theory

The Science of Consciousness conference has been organized annually since 1994 by the University of Arizona and Stuart Hameroff, a leading advocate for the Orchestrated Objective Reduction (Orch OR) theory. The conference has drawn many leading thinkers, including Bernard Baars, who developed Global Workspace Theory (GWT), and Christof Koch, a key proponent of Integrated Information Theory (IIT). While Ring/Bank Theory is inspired in part by GWT, it proposes a distinct variant: that the workspace arises as an unfolding gradient of dimensionality. As the model gains coherence, it expands from sparse ringframes to richly populated 3D+semantic schemas. When overwhelmed or degraded, the system may revert to 2D, 1D, or even a 0D tracer—a minimal, cyclical node of attention. At its most fundamental level, Caldwell proposes, the rallying signal of consciousness is a stream of filtered transients—a felt qualia stream—that becomes reified into geometry and, ultimately, experience.

> A filtered transients stream is first interpreted as ringframes, then into full experience. The Bank is a geometry schema storing lifelong and possibly instinctual shape knowledge."
>
> *Brad Caldwell*

Caldwell also announced plans for a paper on slow wave entrainment, which will explore how certain brain states and pathologies—such as sedation, hydrocephalus, and epilepsy—may involve a globally slowed frame rate of conscious construction. A 2020 paper by Vesuna et al. found 2 Hz waves originating in the retrosplenial cortex of sedated rodents (posteromedial cortex of humans, key hub of the default mode network). Caldwell suspects that these slow oscillations may entrain the timing of ringframes and disrupt the normal flow of world-model updating. Increased brain entrainment

at low frequency, and a separate phenomenon called hyperpolarization (where neurons become too charged relative to extracellular levels to fire easily), are thought to link to a heightened presence of ringframes over full schema experience. He thinks it might also link to anesthesia, where brain waves get extremely slow (1 Hz) and entrainment reaches levels unsustainable for conscious differentiation.

Taormina, Italy—Presenting Ring/Bank Theory at Science of Consciousness Conference 2023

According to Ring/Bank Theory, the filtered transients stream tends to operate in the 1–40 Hz range and may align more closely with perceptual events than with the regular crests of ongoing sine-like rhythms. It functions as a form of time-division access, allowing one voice or sensation to the mic at a time—whether it's the engagement of your abs, the hum of an air conditioner, the texture of a mood (neuroscience has linked 4 Hz to fear), or the faint scent of cigarette smoke drifting by. These event-driven dynamics may offer a new lens on how timing, attention, and spatial structure combine to produce lived experience. Because these bursts are tied to schema-agnostic geometry, ringframes can act as hotkeys for transitioning between real and imagined schemas—as happens constantly during reading, speaking, and inner thought. The system can fluidly shift from one 3D realm to another while preserving continuity of orientation, location, shape, and frequency.

The first image depicts the proposed ringframes linking a real and imaginal schema together. The stream of rings is thought to occupy a sliding time window, allowing each momentary event to come into focus and then fade over the course of a second or more. The merging of schemas occurs on the present-moment ringframe, where elements from both domains briefly integrate. As that ringframe recedes into the past, the schemas diverge once again. These rings can be thought of as volumetric, time-anchored "scratch-to-reveal" events, where the raw geometry of the ringframe exposes underlying content—what the theory refers to as painted schemas—bringing the full perceptual scene into awareness.

The visual cortex may learn to associate several views of a chess pawn as the same thing, but higher up in the cortex, the shape of the pawn as occupying volumetric space may be learned (Bank level). Even higher up, one can learn that a pawn can take on multiple shape varieties, depending on the manufacturer. The Bank is depicted in the second image as a collection of concentric cube-, sphere-, and cylinder-like shells, but it is not limited to these forms. Rather, it serves as a flexible 3D scaffold capable of instantiating any shape, model, or spatial structure learned through experience. These geometric 1D/2D outlines/surface-skins can be activated by

incoming transients.

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