

## **Ecotones of the Mind**

### **Antoine Bellemare-Pepin**

Antoine Bellemare is a multidisciplinary artist and postdoctoral researcher at Bard College, New-York. He completed his individualized PhD in the fields of neuroscience and digital arts. His research-creation projects focus on the link between creativity, electrophysiological signals, and algorithmic compositions. His work tends to explore how sensory noise influences creative perception, and how meaning emerges from integration of ambiguous information. Poetry, neuroscience, electroacoustic, and artificial intelligence are all vectors of expression that could fulfill this same exploration.

### **Mar Estarellas**

Mar Estarellas is a postdoctoral researcher at the University of Cambridge, specializing in analytical and computational methods with a focus on information theory. Her research aims to identify neural informational features that correlate with consciousness and cognition across various states and populations. Mar brings a rich background in machine learning and interdisciplinary projects that integrate science, art, and technology.. She holds certification from the Association of Nature and Forest Therapy (ANFT) as a Forest Therapy Guide and has been leading 'Intuitive Painting' workshops in Nature. Her research focuses on exploring the intricate connections between mind, body, and Nature. Her work is driven by a profound commitment to enhancing the synergistic human and more-than-human health and wellbeing.

## Description

*"Humans and ecosystems are of the same kin. Here, we portray the ecotones of the mind as latent morphologies, as hidden sources of life and abundance. In the beauty of the cyber poetics lie diffused entities reflecting new forms of reciprocal embodiment. May the mirror of nature guide us through the richness of our communion, embracing the responsibility and care of a loving relationship. May the soft cyclical beauty tend for our deep belonging, hopeful whispers of intuitive wisdom. Gratefulness will be our first step forward, in the rainforests of the mind, even when the chiaroscuro imprints our souls. And we will gather our compassionate bodies as one, with chimeras of the lands imagining the new shape of our heart."*

*Ecotones of the mind* explores symbiotic relationships that exist between humans and the natural world using neuroscientific, mathematical and digital art tools. Our proposal is inspired by the concept of ecotones: regions where distinct biological communities converge, creating a zone rich in biodiversity. The metaphorical interpretation of ecotones extends to the realm of human relationships with nature and other species, challenging traditional views on separation and individuality. Our end goal intention is to inspire a hopeful future in which technology and nature synergistically interact for planetary well-being.

We use electroencephalography to capture brain signals that influence the generative process of a diffusion model. The artwork is divided into two parts. The first part represents the distinct transformations of two separate human beings, while the second part illustrates how the meeting of their bodies leads to the co-creation of new lifeforms, forming a latent ecology of their minds. In the former, the complexity of each person's brain signals was used to guide a generative AI model in transforming their individual representations into abstract structures—systems of roots and corals. In the latter, a measure of brain coupling was used to guide the intensity of the morphing from their original human forms to a collective imagery of chimeric animals. By leveraging the two users' cognitive variability, the system allows for continuous and fluid co-creation, moving beyond the traditional prompt-based interactions common in generative AI workflows. This artistic process mirrors the ecological concept of ecotones, reflecting how individual lives intertwine and influence one another, fostering a biodiverse web of shared experiences and transformations.

Through the lens of ecotones, we are encouraged to reconsider our role within the larger ecological framework, highlighting the importance of community and reciprocity in transcending boundaries. As we observe our representations morph and merge, guided by the invisible link of our neural activities, we witness a digital metaphor for the continuous reshaping of our identities and connections. The beauty of shared creation emerges, a vivid testament to life's complexity and our interconnected existence, ever reshaped by the shifting relationships of our synergistic bodies.

The two humans depicted in the video are the co-creators of the artwork (Mar Estarellas, Antoine Bellemare)