

Artist and collaborators:

Mariane Laporte is a Montreal-based artist-researcher pursuing a Master's degree in Communication with a specialization in research-creation in experimental media at Université du Québec à Montréal. She is actively engaged with the Hexagram research-creation network, exploring intersections of arts, culture, and technology. Mariane's artistic practice spans multiple disciplines: she is the singer-songwriter for the Québécois experimental-electro-rock band Ellemetue, a filmmaker, and a journalist for Panorama-cinema. Her recent work explores interactive art, performance, feminist studies, artificial intelligence, biotechnologies and digital literature.

Ali Saheb-Pasand is a PhD student at McGill University, affiliated with the Mila - Montreal Institute for Learning Algorithms. Ali's research focuses on computational neuroscience, deep learning, reinforcement learning, and representation learning.

Kenny Lefebvre is a researcher and media artist specializing in experimental media. His work involves video projection, electronic prosthesis design, and multimedia installation. He has played key roles in a range of projects, from video design for theater productions to offering technical consulting services. Additionally, he specializes in web integration, SEO, and e-marketing.

Milton Riaño is a Colombian new media artist and spatial analyst based in Montreal. His work integrates new media technologies for data visualization, real-time processing, human-machine interaction, and research on technology's impact on time and space perception. He has developed multimedia workshops and exhibits with multidisciplinary teams and holds specializations in fine arts, creative technologies, and spatial analysis.

Brian Condori is a creative professional specializing in brand design, social media content creation, 3D modeling, and animation. He is dedicated to blending visual creativity with functionality, delivering clear and effective designs.

Title: *Immaculate Conception Inc.: A Journey Through the Future of Birth*

Imagine a world where the miracle of life transcends the biological constraints of the human body. *Immaculate Conception Inc.* invites you to experience a gestation - from fertilization to delivery - in just fifteen minutes. A critique of assisted procreation in capitalist societies. This interactive installation combines generative AI and the human senses to simulate a pregnancy outside of the woman's womb. This is not just a glimpse into the future—it is a research-creation about ectogenesis, raising profound questions about the essence of motherhood.

Installation Overview:

Participants enter a digital environment filled with multisensory devices equipped with screens, each capable of conceiving a baby. As they engage with these interactive machines, they speed-connect with their future child at all stages: from fertilization, to embryonic development, and fetal growth, culminating in a computer-generated labor and delivery. Guided by a narrator, their mission is to ensure healthy development, a journey enhanced by integrated audio, visual, and tactile elements. AI-driven imagery is generated in real-time via an API, while speech-to-text technology activates system prompts and language models, responding to participants' inputs. Python coding integrates these interactive components. The journey begins with the signing of an adoption contract and concludes with the issuance of a birth certificate, leaving the users with a provocative question: What if you realized that the connection with the newborn was never truly formed? Would you still choose to adopt?

Scene 1: Introduction

A screen welcomes a user, displaying a fifteen-minute countdown. The multisensorial device introduces "Immaculate Conception Inc.," a fictional medical company specializing in ectogenesis. Once the procedure begins, there is no turning back and skipping a step results in the loss of parental insurance.

Scenes 2 to 9: Sensory Stations

Station 1: The participant uses an iPad to connect an augmented umbilical cord to their navel, experiencing nutrient and oxygen transfer to the fetus,

Station 2: A microphone allows the user to tell a story to the fetus, with a brain barometer filling up, symbolizing memory formation.

Station 3: The user peers through a small opening to uncover a dream world, where the fetus' subconscious is generated based on prompts from station 2—a fusion of the user's story with the one of past user. The randomness of the dream is influenced by the user's body temperature.

Station 4: A video-game-like gender reveal involves popping a balloon to discover the fetus gender, represented by confetti symbolizing a diversity of gender symbols. The user chooses a name.

Station 5: The user pursues a song, according to the past user's melody, emphasizing the importance of frequencies for fetal development. The voice is recorded with a microphone and modified via a MIDI synth.

Station 6: A camera adjusts the clarity of the image it captures of the user to simulate the developing vision.

Station 7: The user feels a tactile connection with the fetus' heart through a soft fabric, reinforcing the emotional bond.

Station 8: A labor simulation allows the user to "push" and reveal the baby's face, composed of a morph of features from previous users and the current participant (the user's portrait was captured at station 6).

Station 9: The user - now parent - tries to calm the cries of the little one while having to keep an eye on a baby monitor equipped with night vision mode, while waiting to be called to reception. If needed, Stations 5 and 9 are available to help soothe the baby.

Scene 10: Conclusion

The new parent chooses to either adopt, abandon or return the baby to the cloud.

Note: All user inputs are compiled into a local database, creating a self-sustaining ecosystem where future interactions are influenced solely by past users' data—eliminating the need for large-scale data collection and ensuring maximum privacy. This strategy will allow all users to co-create a baby within the ever-evolving installation.

1. Ectogenesis and the Development of Artificial Embryos

The installation proposes a simulation of what could be ectogenesis; a human gestation that takes place entirely outside the woman's body. While artificial wombs are not yet used for human reproduction, significant progress has been made in this field, particularly with research on artificial embryos and incubation systems for extreme preemies.

2. Fetal Consciousness and Sensory Stimuli

Another fundamental aspect of the installation is the focus on sensory stimuli during gestation. Research shows that fetal brain development is already advanced halfway through gestation and that sensory stimuli play a crucial role in correctly wiring primary sensory regions. The installation allows participants to interact with a simulated fetus using tactile, auditory, and visual sensors, thus replicating some of the stimuli the fetus might experience in utero. This approach questions how technology can not only replicate but also potentially alter these crucial sensory experiences for best or worse.

3. Reproductive Ethics and Biotechnology

Finally, the project fits into the broader debate on the ethical implications of new reproductive technologies, the significance of parenthood, biological inheritance, and the very definition of humanity. The interactive installation allows a space where users can not only tame this perhaps not so far reality but also actively co-create a simulated life.

A prototype of the "memory station," developed during the Co-creating with Art and AI residency at Mila Institute, lays the foundation for this exploration. It has been shown as a group exhibition on September 14th and 15th 2024 at the Agora du Coeur des Sciences in Montreal. The residency explores how we can assert agency in designing spaces and practices where creative processes, AI thinking, and human-centered design coexist. Specifically, it addresses ethical considerations such as transparency, consent, privacy, bias, and the ecological impacts of AI, while also seeking to develop alternative approaches to AI development beyond the traditional Western frameworks.

Immaculate Conception Inc. is not the artist's "baby," but the collective creation of an entire consenting community — an entity existing as both living and non-living, perpetually evolving and learning.

The memory training begins with the artist's initial input — her body temperature and a personal story — but evolves through the voices, warmth, and imaginations of participants, becoming a shared, dynamic narrative that reflects a collective human experience. The final installation will be processed on a local GPU, ensuring the information stays secure and private within the artwork itself.

Teaching AI to act as an unborn child:

An interactive and creative use of AI storytelling and image generation that builds on shared narratives. Here's how it flows :

1. Parent's Story Integration

- A parent shares their story, which is merged with the accumulated history of previous stories.
- The AI uses this combined narrative, preserving the essence of all contributions while focusing more on the current parent's story.

2. System Prompt Setup

- The system adopts the persona of an unborn child, crafting its "dreams" based on the latest input and the collective memory of prior stories.
- The system prompt would be structured as: You are an unborn child. The story your parent told you is: {parent_story}. Previous stories were: {history}.
- This prompt helps the system "dream" about the world, blending themes and motifs from the parent's input with the shared archive of narratives.

3. Dream Description Prompt

- The unborn child "describes" its dream in a compact response influenced by the parent's story, focusing on vivid and emotionally resonant imagery.
- Prompt example: You are dreaming about the world. What do you see? Answer based on a combination of elements from the story your parent told you and previous stories. Put more emphasis on your parent's story and give your dream in at most 100 tokens.

4. Image Generation

- The generated text describing the dream becomes the input for an image generation model like DALL-E 3.
- Example image generation prompt: Generate an image based on this prompt: {dream_text}. Do not generate words that are inappropriate. Do not include any text on the image.
- This ensures the dream is visually represented, translating narrative imagination into a shared visual experience.

Guidelines to Study Memory Dynamics in Human-AI Narrative and Imagery Interactions :

These guidelines outline how the interactive installation can be framed and qualified as research.

AI Memory

1. Tracing Generative Evolution

- Analyze how the language model and image generation model evolve as they process cumulative data (parent stories, merged stories, and images).

- Track patterns in how prompts and outputs shift over time, influenced by earlier contributions (e.g., identifying biases, recurring motifs, or creative "stagnation").

2. Story Retention and Influence

- Evaluate how the merged stories preserve key elements of the parent's input while incorporating past data.
- Test the AI's ability to balance "short-term memory" (recent inputs) with "long-term memory" (archived data) by varying the number of stories in the history it references.

3. Image Synthesis Trends

- Study the extent to which new images diverge or converge from earlier ones in terms of style, theme, or structure.
- Measure how randomness (temperature parameter) and physiological inputs (e.g., body temperature) influence these outputs.

4. Feedback Loop Testing

- Experiment with user feedback loops: allow users to rank or critique AI outputs and study how the model adjusts future generations based on this input.

Human Memory

1. User Recall and Reconstruction

- After viewing their generated images and merged stories, test participants' ability to recall and reconstruct the narratives they shared.
- Compare the fidelity of human memory to the accuracy of the AI's story and image synthesis.

2. Emotional Impact Analysis

- Assess how interacting with the installation affects memory retention and emotional associations. For example, does the act of storytelling followed by visual synthesis enhance memory of the experience?
- Use post-participation surveys to measure the depth of emotional connection and memory recall.

3. Cross-User Memory Patterns

- Study how narratives and images influence successive users.
- Analyze whether users incorporate motifs or details from previous participants into their own stories, consciously or unconsciously.

4. Physiological Correlation

- Explore correlations between body temperature readings and memory recall or narrative choices. For instance, does a higher temperature lead to more vivid imagery or greater storytelling complexity.

Cross-Analysis : AI and the Human Memory

1. Convergence and Divergence

- Compare the AI's generated outputs with users' recollections of their original contributions.
- Identify gaps between human memory's subjective interpretation and the AI's objective synthesis.

2. Community Memory

- Investigate how the collective memory (archived stories and images) reflects or deviates from individual inputs over time.
- Study whether users perceive the collective narrative as coherent or fragmented.

3. Temporal Decay and Reinforcement

- Simulate forgetting in the AI by reducing the weight of older contributions in the merging process.
- Contrast this with human memory decay by testing users' recollection of earlier contributions versus recent ones.

Data to Collect for Analysis :

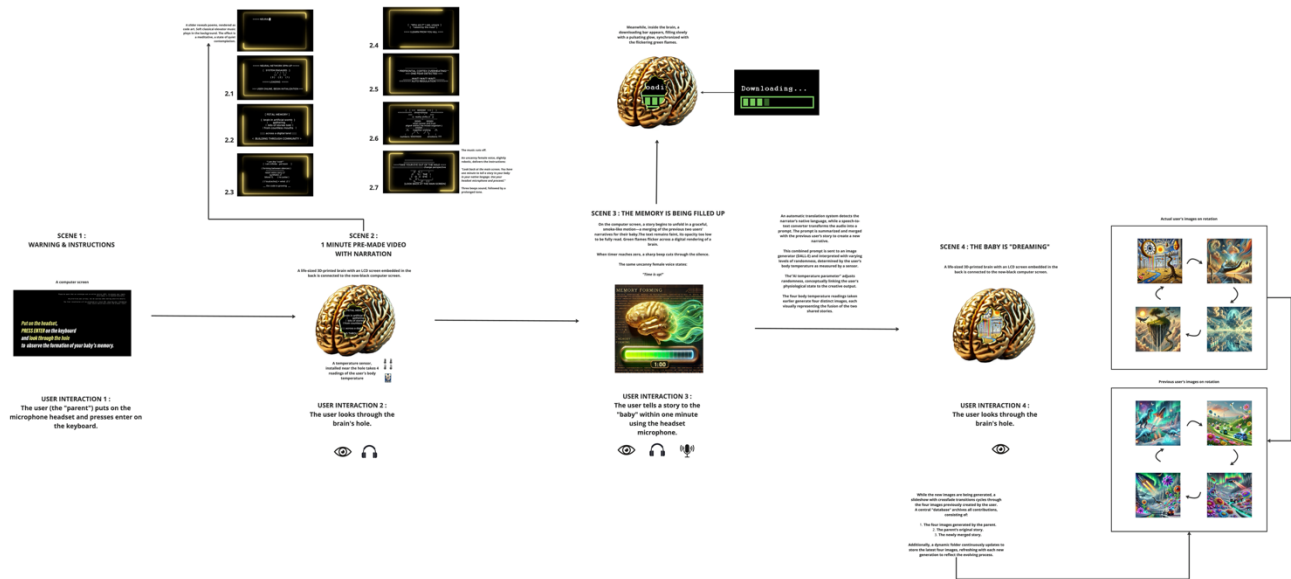
AI Data: Logs of input prompts, generated texts and images, and randomness parameters.

Human Data: Audio recordings of user stories, physiological readings, surveys, and memory tests.

Comparative Data: Metrics evaluating the overlap or divergence between human and AI-generated content.

Appendix I

UX design for the memory station



The **Memory Station** consists of **4 scenes** designed for an engaging user experience.

Scene 1 starts with a privacy warning and instructions displayed on a computer screen. The user puts on a microphone headset and interacts by pressing "Enter" on the keyboard to proceed, then looks through a hole in a life-sized 3D-printed brain with an LCD screen embedded in the back, connected to the now-black computer screen.

Scene 2 features a 1-minute video introducing the concept, where users passively observe, accompanied by an immersive soundscape. An uncanny, slightly robotic female voice delivers instructions. A temperature sensor near the brain's hole takes 4 readings of the user's body temperature.

Scene 3 focuses on "filling the brain's memory." The user tells a 1-minute story using their microphone headset. On the computer screen, a faint, smoke-like text appears, merging the previous two users' stories. Green flames flicker across a digital brain. When the timer hits zero, a sharp beep sounds, and the voice states, "Time is up!" Inside the brain, a pulsating download bar appears. Speech-to-text and translation systems transform the story into a prompt, which merges with the prior user's narrative. This prompt generates four images via DALL-E, with randomness adjusted by the user's body temperature readings.

Scene 4 features the "brain dreaming" phase. AI-generated imagery appears inside the brain, while a slideshow with crossfade transitions cycles through the past user's 4 images, followed with the actual user's. A central database archives contributions, including the four images, the parent's original prompt, and the newly merged story. A dynamic folder continuously updates with each new generation.

Appendix II

Immaculate Conception Inc.'s stations have the potential to evolve into standalone interactive installations. For the "memory station," the prototype's computer screen could expand into a large-scale display (Figure 1) or, on a smaller scale (Figure 2), portable setups for institutions like hospitals. The "brain" could be reimaged as a large sculptural structure, adding an architectural dimension to the public space. This immersive environment would envelop participants in the construction of the "memory" of the baby, creating the sensation of being inside the evolving entity. Spectators could observe the process in real time, generating excitement and anticipation to be the next participant. This transformation would turn the installation into a communal, interactive spectacle, merging personal contributions with collective oral storytelling and creation.

Figure 1

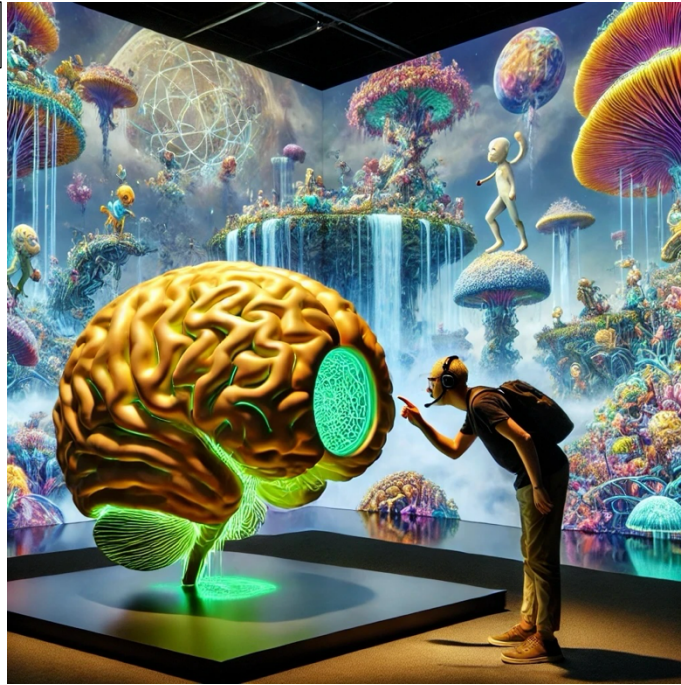


Figure 2



Appendix III

Sample from the *Co-creating with Art and AI* group exhibition
Agora du Cœur des Sciences de Montréal, September 14th and 15th 2024



Parent's story (user 29) : Am I telling a story? If I am, it's about the time I first went to a ski hostel after finishing my undergrad. There's not much of a story, really, but I guess it was just very memorable. It was the first time I truly had the chance to go out, experience something on my own, meet new people, and enjoy a very communal environment. It was all about new connections, new experiences, and having a genuinely great time. Unfortunately, that season had to end quickly because of COVID, but it remains a really nice memory. I don't know—it's a bit of an unprompted story, but let's go with that. Basically, yeah.

Cumulated history : After finishing undergrad, a young adventurer decided to spend some time at a ski hostel, where they stumbled upon a virtual reality experience set in a digitally crafted forest. In this serene, simulated wilderness, they met a diverse group of individuals, including a businessperson, a teacher, an optician, and a magical baby, as well as a friendly hedgehog named Frankie and a golden retriever named Max. As they explored the virtual environment together, they encountered a mother bird feeding her chicks, sparking deep conversations about the interconnectedness of life and the balance between technology and nature. Using cosmic dust, they interacted with an alien vine, further enriching their understanding of coexistence and the cyclical nature of life and death. This unique blend of real-life adventure and digital exploration left a lasting impression on the young traveler, marking the beginning of many more communal experiences to come.



Parent's story (user 30) : It's about a little girl who leaves her family and her country to travel far away for her studies. Over time, she begins to realize how much she misses her family and starts doubting her decision to stay in this new country. She even considers going back. Yet, it feels strange because she now has a new home and no longer fully belongs to either place. She feels out of place, caught between worlds. To cope with the situation, she focuses mostly on her work, trying not to dwell too much on the distance or on the inability to attend school back home.

Cumulated history : A young girl, having left her family to study abroad, felt increasingly disconnected from both her old home and her new one. In her struggle to find belonging, she stumbled upon a virtual reality experience at a local ski hostel, designed to mimic a serene forest. While exploring this digital wilderness, she met a diverse group of individuals, including a teacher and a magical baby, as well as animal companions like Frankie the friendly hedgehog and Max the golden retriever. Together, they discussed the interconnectedness of life and the balance between technology and nature, which mirrored her own feelings of being between two worlds. This encounter, blending her physical journey and virtual exploration, sparked a newfound appreciation for her unique place in the world, helping her embrace the complexity of her identity.

Appendix IV

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