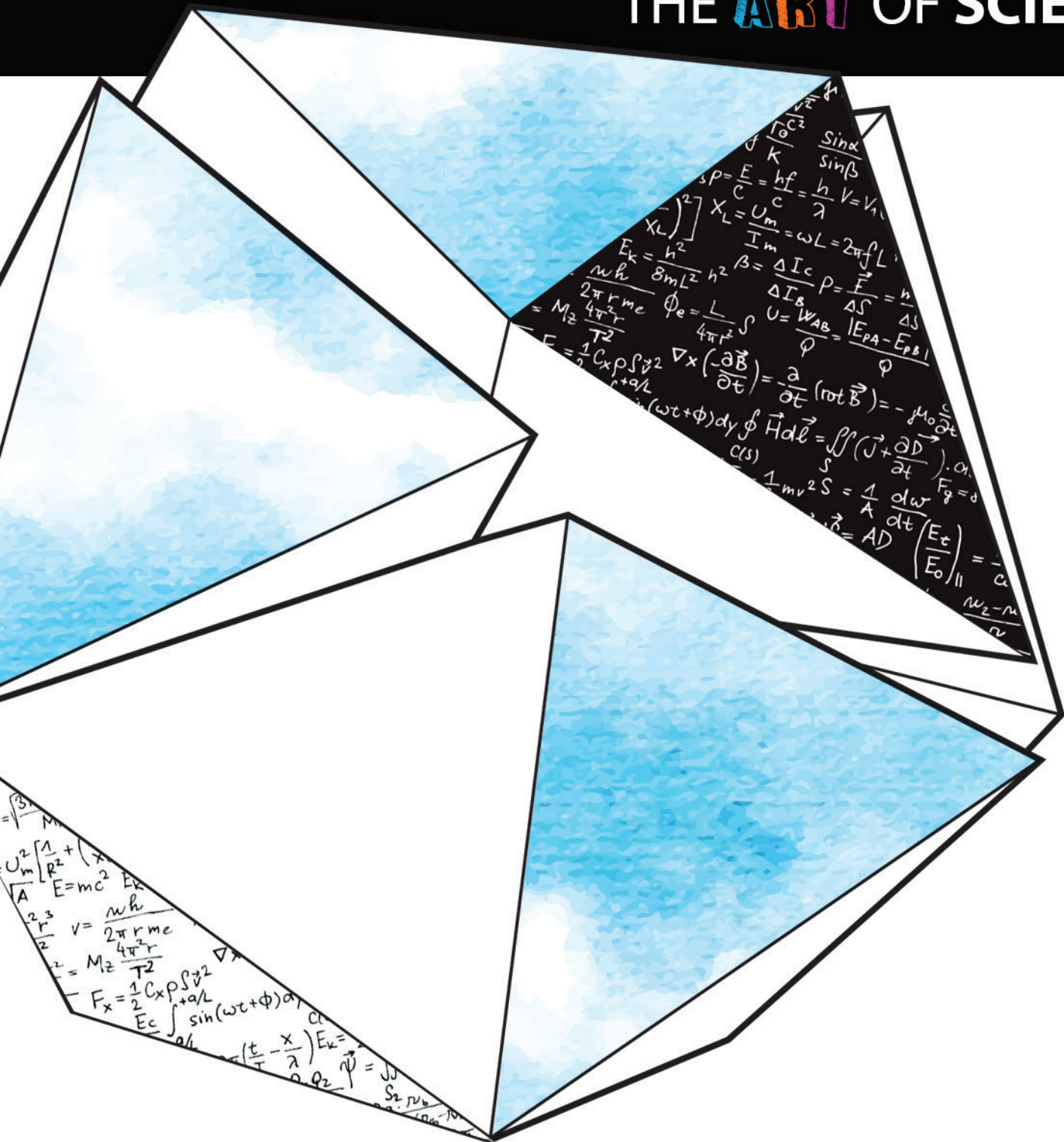


THE ART OF SCIENCE



“It is imperative that we give up the idea of ultimate sources of knowledge, and admit that all knowledge is human”

– Karl Popper

A NEW DEFINITION OF SCIENCE

Science has been traditionally conceived as the sole depository of Truth, the only type of knowledge able to provide a unified comprehension of reality. However, it is becoming increasingly clear that the more we look for explanations through science alone, the more unknowns we will encounter.

“The greater one’s science, the deeper the sense of mystery.” – Vladimir Nabokov

It is time to accept the intrinsic limitations of science, and acknowledge that it cannot provide us with all the answers. We must embrace mystery as a natural part of our human existence, accessible only through a new approach to knowledge - organic and not linear, multidimensional and not flat, fragmented but whole.



THE **ROLE OF ART**

Art is able to express ideas as metaphors, making them tangible in a way that can facilitate our comprehension of complex mathematical concepts. As such, **art can play a vital role in translating science into easier and more accessible terms.** With its unique capability of “*humanizing*” science, art will revive the long-lost connection between science and the general public, and help scientists gain new perspective, inspiration, and purpose.

Both disciplines search for answers to the same fundamental questions: *Where is the truth? What is relevant? How can we improve our human condition?* Both explore reality with an open and inquisitive mind, seeking a richer and deeper exploration of life aimed at improving the human condition. At this deep level, there is no distinction between beauty and functionality, art and science. Both are intimately intertwined.

Art becomes a tool of investigation and a vehicle of comprehension as meaningful and powerful as science, not in competition with science but complementary to it.

In this framework, **closing the gap between art and science** is the natural step towards an organic and comprehensive progress of science, and a crucial element in raising its popularization and accessibility.

THE HUMAN DIMENSION

Like art, science leads to progress because it inspires dreams and stimulates human imagination. The scientist and the artist are archetypes for anyone who tries to overcome the limits of the human dimension.

Scientific discovery, similar to any artistic endeavor, is driven by the desire to understand the universe and our place within it. Measuring scientific progress simply in terms of innovation and success is not enough; instead we should always value it as humanity's struggle to turn fragility into strength and overcome the frustration associated with our existence.

With this process comes a full range of emotions from stress, frustration and pain, to excitement, liberation and hope. We become fueled by the thrill generated in the passage from human thought to creation.

Our goal is to find a way to represent science that transcends the beautiful display of data, and emphasizes instead the human process that leads from stagnation to vision, a journey potentially more interesting than the answers we aspire to.



THE SOCIAL DIMENSION

In **any human-centered vision of the universe each right comes with responsibilities**. Scientists have the moral responsibility to pursue the progress of society, and at the same time enhance its ethical values. Before any other question, we must ask ourselves "*What are the social and moral values associated with our scientific effort?*"

At SBQMI we advocate for a humanistic science which aims at finding answers to our deepest questions. Our primary goal is, and always will be, to **train scientists to be excellent researchers, compassionate leaders, and whole persons, able to balance complexity with a profound desire to understand the world surrounding us**.

Art will play an essential role in defining the ethical scope of this scientist archetype by providing guidance, vision, and new creative parameters born from the essence of our own humanity.

Ultimately, **art has the power to complete science by enriching scientists to become full human beings**.

WAYS OF **EXPLORATION** (IDEAS)

DIG INTO PERSONAL STORIES: what is the motivation behind scientific aspiration; why do scientists embark upon their personal exploration of reality; how do they go from a general desire of discovery to focusing their intellect in a certain direction.

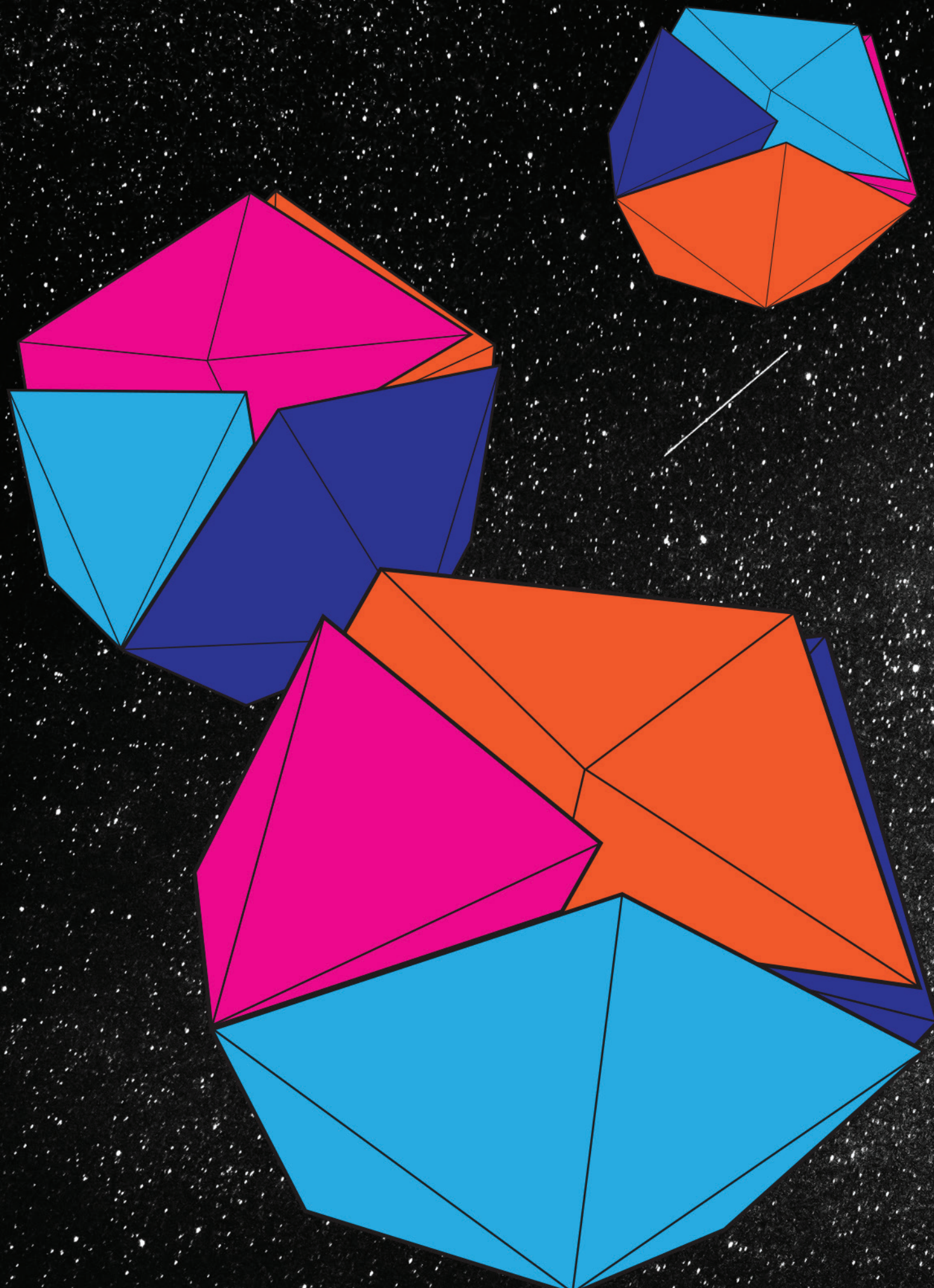
EXPLORE THE PARALLELISM IN THE EVOLUTION OF QUANTUM SYSTEMS AND THE HUMAN PSYCHE: elaborate on concepts like frustration and coherence; discover how these overlap or differ in the scientific and artistic mind.

EXPLORE THE IMPACT OF WOMEN IN SCIENCE: what is their contribution to the development of scientific thought; how does their way of approaching science differ from that of men.

REPRESENT WHAT HAPPENS IN A SCIENTIFIC LAB placing more emphasis on emotions than results, pairing excitement with frustration, hope with disappointment.

PORTRAY RESEARCH AS A WAY TO EXPLORE THE ORIGIN OF THOUGHT: why do we come up with certain ideas; where do they come from; how do we go back in the thinking process to find the origin.





THE FRUSTRATED ICOSAHEDRON

Our vision and efforts are symbolized by a sculpture named "*Frustration and Curvature*", built by artist Pamela Davis Kivelson and a group of physicists, which SBQMI has the opportunity to acquire and display in the building itself.

Artist description: *Packing circles in two dimensions is easy: six circles perfectly fit around a central one to form a hexagon, and this pattern can be continued to cover the whole plane. The triangle formed by three circles fits together into a unstrained hexagon. Packing spheres in three dimensions is more subtle. Twelve spheres surrounding a center one rattle around a bit. Four spheres form a tetrahedron, but twelve tetrahedra won't quite fit together into an icosahedron.*



Many materials are subject to frustration: *their local low-energy structures can't be continued to fill space. The blue phases and twist-grain boundary phases of liquid crystals, the exotic Frank-Kasper phases, metallic glasses, spin glasses, superconductors in magnetic fields, and spinning superfluids all are frustrated and all relieve their frustration with regular or irregular arrays of topological defects.*

(lassp.cornell.edu/sethna/FrustrationCurvature/)

THE FRUSTRATED ICOSAHEDRON IS THE PERFECT METAPHOR FOR THE CHALLENGES AND THE BEAUTY OUR RESEARCHERS ENCOUNTER EVERY DAY AS THEY SEEK TO UNDERSTAND AND TAKE ADVANTAGE OF THESE NATURAL DEFECTS. IT'S PRESENCE IN OUR BUILDING WILL SERVE AS A REMINDER OF THEIR ASPIRATIONS AND AS A WAY FOR ANYONE WHO IS NOT A SCIENTIST TO ENCOUNTER THE MYSTERY OF QUANTUM DYNAMICS.

QUANTUM **MATTER** INSTITUTE **GOALS**

- One artist in residence per year
- Art display and installations in QMI, web featuring, video production
- Open houses at QMI, bringing together the general public with the artists and QMI community
- Presentations/events across the physics community (professors, staff, and students)
- Interdisciplinary workshops/seminars across other communities (art, dance, and poetry)





Stewart Blusson
**Quantum
Matter
Institute**