Developing Young Scientific Minds: The Role of the Arts

Marion Porath and Krista Fogel
The University of British Columbia
Vancouver, British Columbia, Canada
marion.porath@ubc.ca
kristafogel@hotmail.com

A series of provocations

- An exploration of what might be
- An imaginative challenge
  - to raise new questions
  - to think about implications for theory and practice
  - to understand from a new perspective
  - to think about possibilities

    - Gianni Rodari, The Grammar of Fantasy

- Plato shaped our conception of science – “the rational mind” (Eisner, 2008).
- Variety of forms of representation created by humans – “access to expressive possibilities” (Eisner, p. 5).
- Multiple forms of knowing

Natural science became my fascination and it began to permeate my teaching, but what was new in this was that I had become more aware of the presence of my own inner dialogue about the world, and I was also able to talk and wonder aloud with young children – and we were speaking the same language! That language was not confined to “scientific” talk; it was poetic, visual, analogic, kinetic.

– Gallas, 1994, p. 72

Or if you don’t know what a wing is, and how it is made, you can draw it, and then you know.

– Juan, age 6 (Gallas, 1994, p. 130)

We have to draw the table so we can understand it.

- Tommaso and Daniela, preschoolers (Reggio Children, 1997)

Ethan, Grade 1

I like reading. I love it!

I'm reading a chapter book about Star Wars and … and … I forget!

That's the master … fighting the master … evil … he fights the hardest guys to beat. Like the flying armoured ones with huge wings. The wings are as big as the school.

I like to draw lots. Draw and read. I like reading more.

The Poetic Voice

A poem is a little short, and it tells you some things in a funny way. But a science book, it tells you things like on the news …. But in a poem, it's more … the poem teaches you, but not just with words.

Carolyn, 1st grade (Gallas, 1994, p. 136)

Tian, age 6

Spring is a leaf born
some flowers bloom
animals awake
people start to play
Violet comes back to school.

Gallas, 1994, p. 111

The hologram machine

David Walker
Bamboo in the Wind
Photo included with
permission

David Walker
Golgi Apparatus
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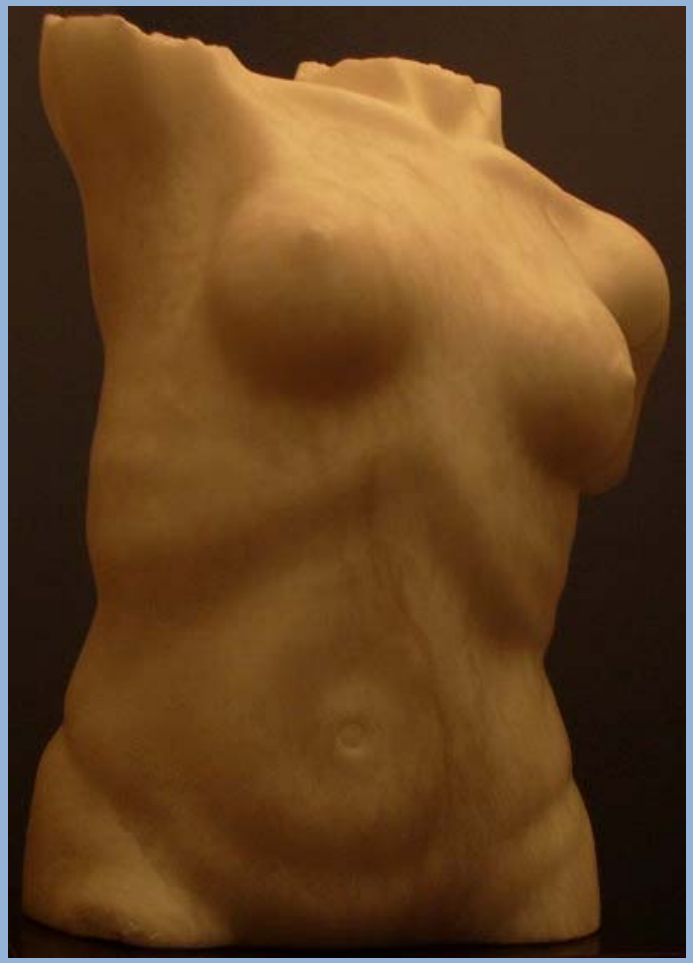
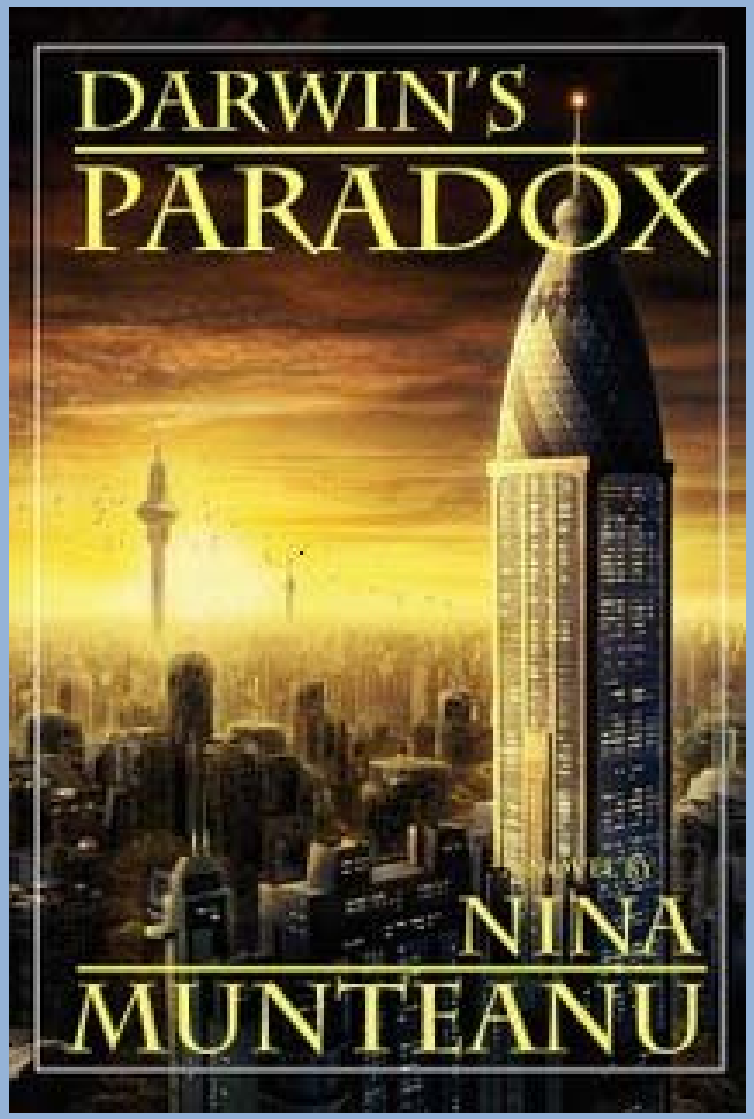
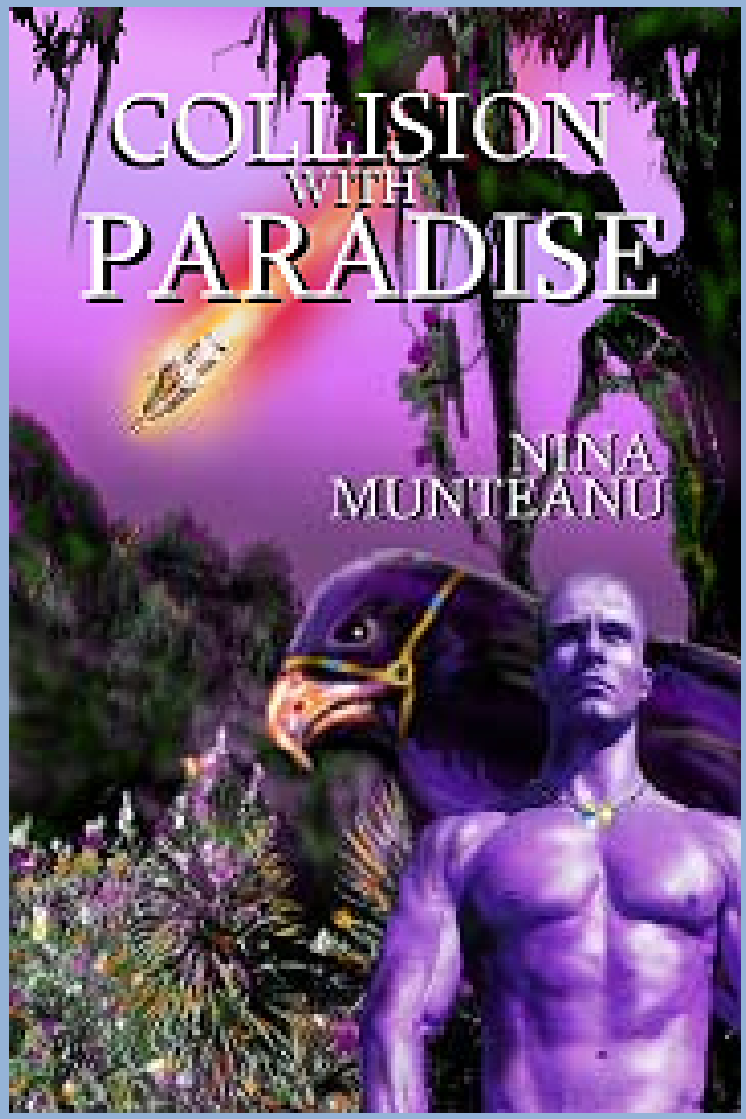




Nina Munteanu
Darwin's Paradox
Photo included with permission



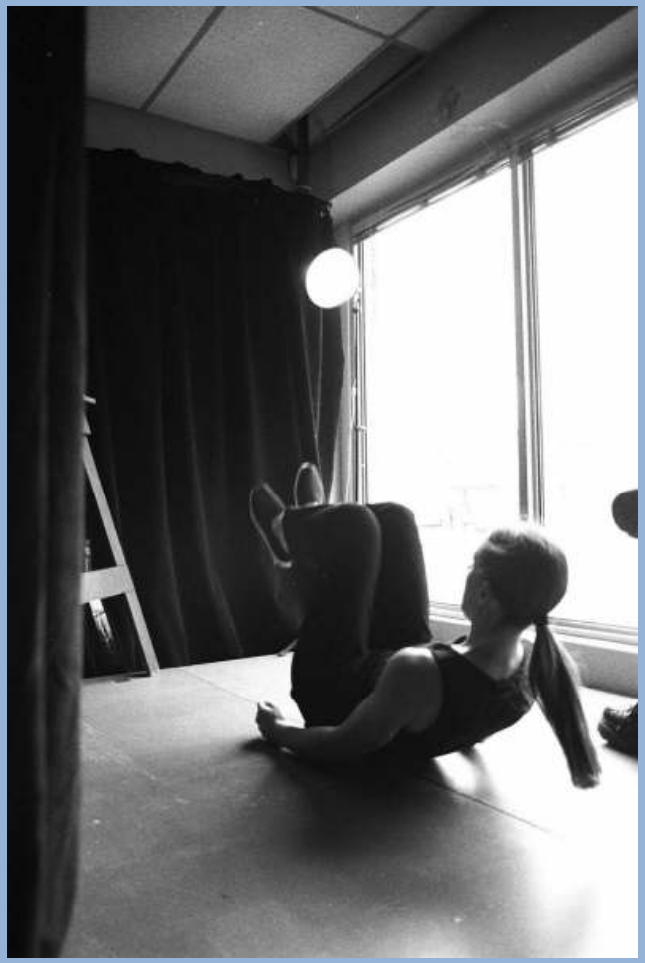
Nina Munteanu
Collision with Paradise
Photo included with permission

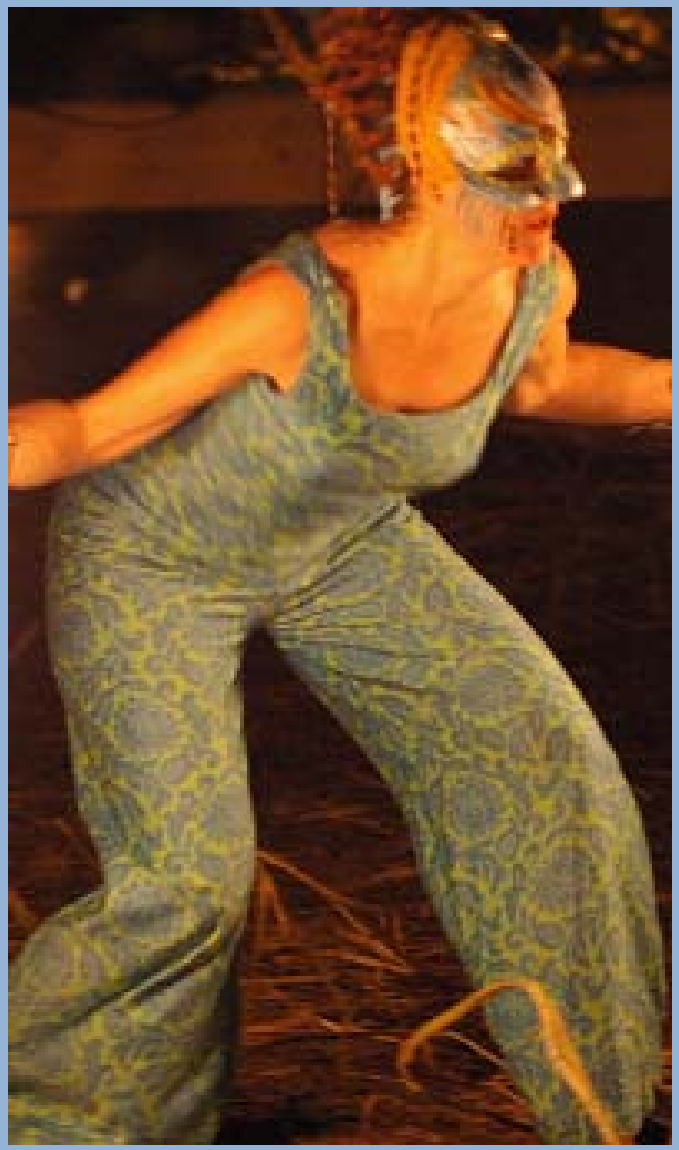

THE CYPOL
NINA MUNTEANU

Making algae sing

[There was a] very intelligent fellow, but obviously coming at things from a different angle. We got to discussing what we were going to do [for main projects as graduate students]… so I turned to him and asked him 'Well what are *you* going to do?' and he said, 'My intention - is to make – algae – sing.' And I went – 'Sure!' …But there was something to that. Obviously he was getting at something else. …That has sat with me. What it did was it made me realize what I'm doing. …Not so much make algae sing, but… to bring a new perspective to science. Perhaps that more than anything else.

Nina





Tanya Dahms
The Seed
Photo included with
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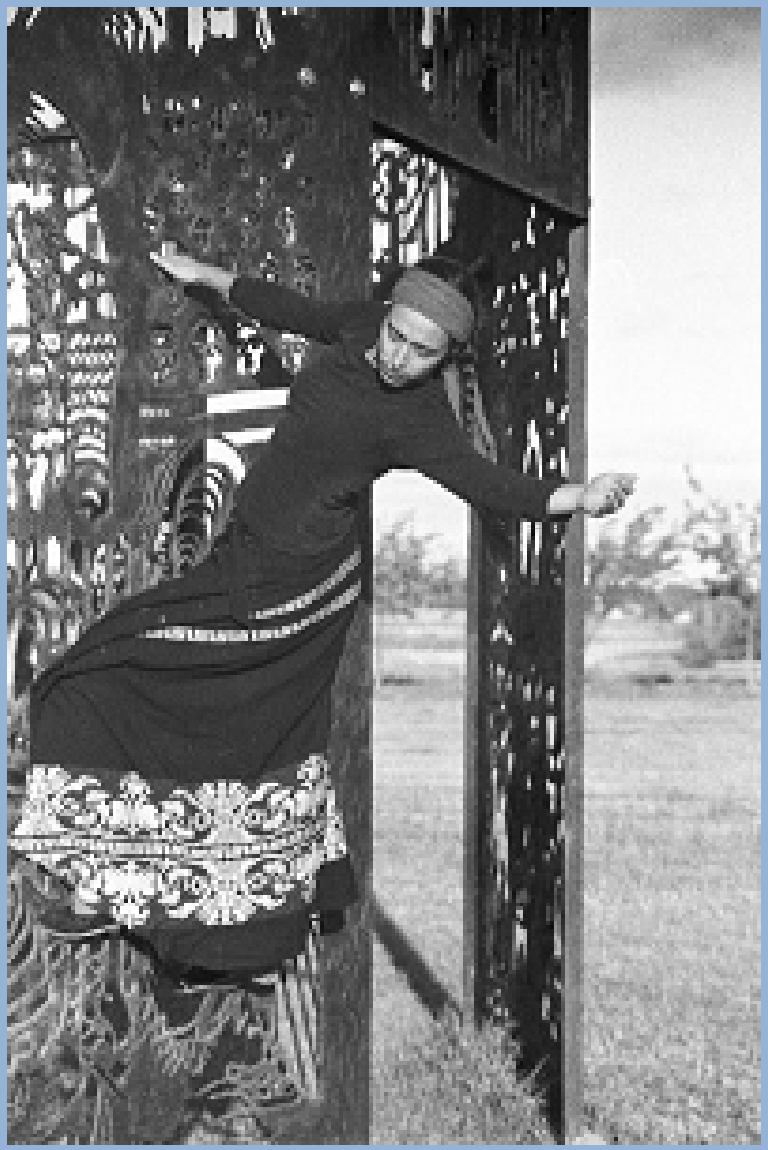

Tanya Dahms
Le Jardin de L'Esprit
Photo included with
permission

Proteins in motion

- Proteins] are now often described in terms of their motion, for example, breathing… And for me… dance directly translates into that… dance is a lot about breath… So understanding that motion, and then starting to think a bit in terms of how the protein itself would move, function and react, and how motion is crucial to its actual function can lend great insight… I think just that simple and practical understanding of movement and motion helped me understand proteins with greater depth.

Robert Bridson
Title N/A
Photo included with permission

Robert Bridson
Title N/A
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[This] experience with using science as a tool to enhance art speaks not so much to making a statement about life and science … but more to using science to make a technically sound work of art. “The main focus of all this is, in particular, *building* tools and methods that artists can use when making films.” While Naori’s science images, Nina’s science knowledge, and David’s experiences in science have guided their artistic work [these] science skills have guided the artistic work of others. Whatever the case, their experiences illustrate what it is like when the arts and sciences fit together as complementary tools to “observe” one another’s disciplines, the world, or their Selves for greater understanding.

Artist/Scientist
Scientist/Artist

- Resonating
- Whole being is singing
- At one
- Connected to core of Earth
- Connected to star above my head

- The intuitive part
- Listening to instincts
- Good scientist
- Artist at heart
- New connections
- Give brain time
- Switch gears

Complementary tools/complementary processes

- More than material use
- Artistic process of openness and play ←→ discipline to access creativity in science
- Feeling connected to something more through the arts

- We discount the natural expressive and intellectual tendencies of children to think divergently …. We relegate metaphoric, transformative action and talk to the world of play and exclude it from the serious pursuit of learning (Gallas, 1994, p. 117).