

THE BANFF CENTRE

BANFF NEW MEDIA INSTITUTE

2003

# Carbon versus Silicon: Thinking Small/Thinking Fast

August 7 - 10, 2003

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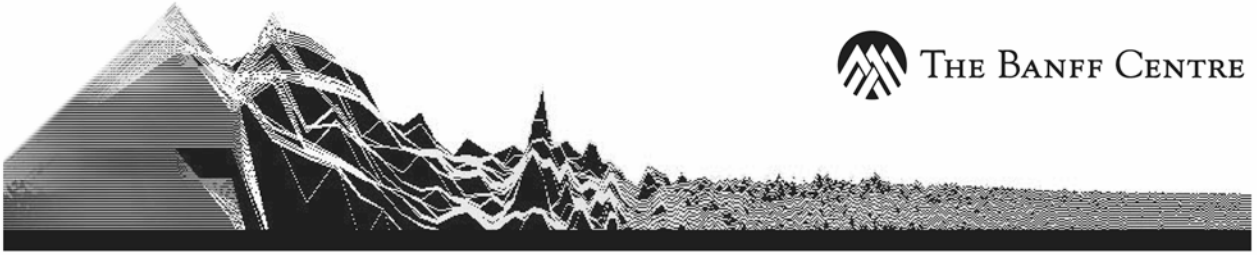
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Listen live at [www.horizonzero.ca](http://www.horizonzero.ca) OR  
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Carbon versus Silicon: Thinking Small/  
Thinking Fast Agenda



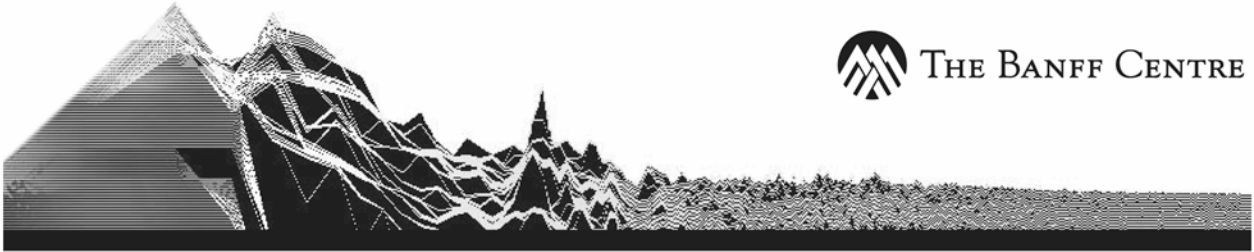
## BANFF NEW MEDIA INSTITUTE

### Original Summit Description

2003

Carbon versus Silicon: Thinking Small/  
Thinking Fast Agenda

Nanotechnology researchers intervene at the level of carbon, shifting fundamental building blocks of matter at the atomic and molecular levels. Computer science and digital media intervene into the virtual, working with non-physical matter. If the digital revolution brought a new era, then the nanotechnology revolution heralds even more change. For one thing, it returns us to our bodies, to technologies that are literally below and on the skin. Nanotechnology R&D is opening up vast new horizons in material sciences, medicine, biotechnology, genomics, and manufacturing, as well as computing, information and communications technology. Where do the fields of silicon and carbon overlap? Where do they conflict in concept and methodology? Both fields have the challenge of representing abstract concepts and processes that cannot be seen. What social and cultural tools do we need to understand these shifts? How can artists and designers from the physical and digital domain participate in the carbon revolution? How can we imagine new applications for these new materials, in wearables, architecture? As humans, we have struggled with the limits of the speed of light, the vastness of the universe, the accelerated pace of digital technologies, and now with the expansion of the world inward, to a minuteness and complexity of scale difficult to imagine. How can we approach the responsibility to the unseen; what are the ethics of intervention? Digital media and cultural knowledge may allow us to ride the early waves of this tsunami. This atom-breaking summit will bring together nanotechnology researchers, members of the National Institute for Nanotechnology, applications designers, ICT researchers, social scientists and humanists, science fiction writers, new media artists, fashion designers, choreographers, architects, and designers. This summit was created in collaboration with the Department of Design/Media Arts, UCLA, the Department of Chemistry, UCLA, and The National Institute for Nanotechnology, University of Alberta.



## BANFF NEW MEDIA INSTITUTE

# AGENDA

2003

Carbon versus Silicon: Thinking Small/  
Thinking Fast Agenda

Sara Diamond, Executive Producer, TV & New Media, Artistic Director, Media and Visual Arts, The Banff Centre, will moderate or co-moderate all sessions.

### Wednesday, August 6th

9:00pm

#### Meet and Greet

*Location: The Cozy Nook, The Sally Borden Building, The Banff Centre*

There will be an opportunity to introduce yourself and your goals for the summit.

### Thursday, August 7th

8:00am – 9:00am

#### Technical Run Through

*Location: Room 103, The Professional Development Centre (PDC)*

**All presenters FOR THE DAY must attend - see technical run through schedule for times**

9:00am – 9:45am

#### Opening Remarks and Introduction of Participants

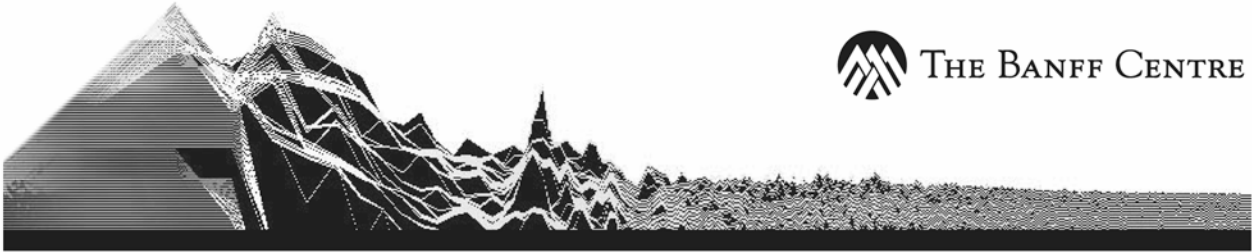
*Location: Room 103, The Professional Development Centre (PDC)*

- **Sara Diamond** – Executive Producer, TV & New Media, Artistic Director, Media and Visual Arts, The Banff Centre

#### **To Open Discussion: Nanotechnology - Catch The Big Wave**

Technological revolutions are often described as waves – with intensive curiosity driving research as they swell, innovation at the crest and applications as the wave rushes towards the shore. Perhaps there are many smaller waves that overlap, crash into each other and eddy as others splash upon the beach. The waters themselves are full of life and its forces. Where are we in the sea of nanotechnology?

The digital revolution continues to transform society. Yet the most obvious failures are the gaps between human needs and the relentless pace and nature of technology change. “Users” burst the bubble of the silicon economy, but at the same time, they innovated and invented, sending applications and technologies into lateral directions.



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If social and cultural researchers integrate early into the innovation process, will technology and social change be in a healthy symbiosis? Where do ethics fit in this process? How can we work with and around the specter of “gray and green” goo—of micro-robotics and self-replicating systems?

When does discovery risk being hampered by the immediacy of present values?

Biotechnology and nanotechnology dissolve together. Are the sands of silicon the glue that binds them? This is an ocean where biological life breeds with new forms of artificiality. Artifice, the expression of form, the domain of culture, is immediately summoned.

Can the lessons of silicon inform the carbon revolution, so powerful yet so invisible? What methods from silicon and which from carbon research are aligned, where are the clashes? What alliances can we make between the visible and the invisible processes of science? Visualization is the clearest portal where computer science, art and design are able to provide interpretation. How can we illustrate in ways that provoke understanding?

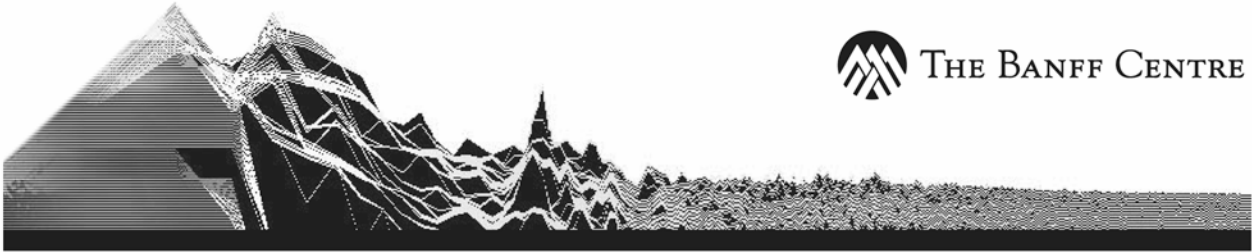
Artists, designers, writers and architects are often the best creative consumers. How can we influence what is actually made and not simply argue against? Many artists, designers and architects work with physical processes as well as digital design. They illustrate the alliance of carbon and silicon and the contradictions in working between and with these forms and methods. How can we imagine and organize ways of applying and creating from and with the materials of nanotechnology in our own domains?

The goal of the days to come is to brainstorm parallel and overlapping research, to begin an exchange. Some here are already seasoned swimmers, others want to dive in, others will surf this next transformation, yet others want to know what lies beneath the surface. Can we share a view of the shoreline and an awareness of the depths?

The summit will put our toes in the water, as science, applications experts and artists share their thoughts on the vast waters of nanotechnology and what we might achieve together. Please query assumptions and language and look for fresh ideas, enjoying the complex pleasures of interdisciplinary dialogue in the Rocky Mountains.

The format tries to leave time for discussion, so please give us broad ideas, stick to time tables and let's explore together. And please, your talk can be casual if you would like, with some examples sprinkled in for newbies on all sides of the shoreline.

Sara Diamond will be the lead moderator and will draw in others to assist as required. Co-moderators will be asked to make first response to panel ideas to kick off discussion.



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**9:45am – 11:00am**

**Overview of Nanotechnology Research Hot Spots and Issues**

*Location: Room 103, The Professional Development Centre (PDC)*

- **Catherine Alexander** – Communications Director, National Nanotechnology Coordination Office (Virginia, USA)
- **Andy Gilliland** – Director of Stakeholder Relations, National Institute for Nanotechnology (NINT), University of Alberta (Edmonton, AB)

**With top of mind (short 3 minute) responses from:** James Gimzewski, Victoria Vesna, Russell Taylor, Joanna Berzowska, John Ryan, Pierre Boulanger, and Maroon Tabbal. Followed by group discussion.

**11:00am – 11:15am**

**BREAK**

**11:15am – 12:45pm**

**Collaborative Research: Case Study One**

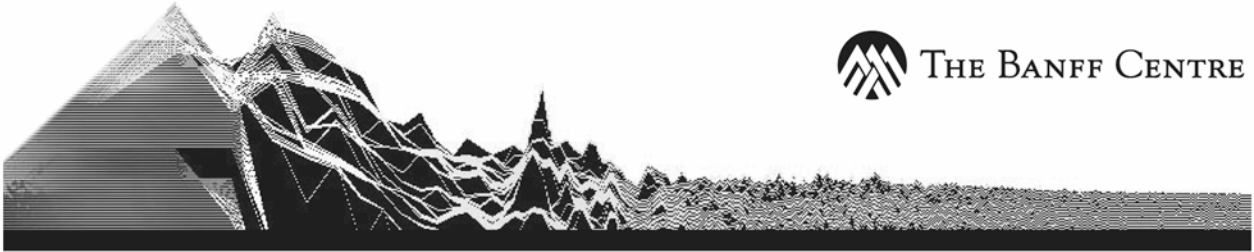
*Location: Room 103, The Professional Development Centre (PDC)*

Panelists will discuss their own areas of research in this area, sharing this with participants and linking it to the summit's themes as appropriate. They will present the ways that they have brought these interests together to create a significant collaborative project- to be premiered in Los Angeles in 2004. Why are they collaborating? What are some of the outcomes? What are shared or clashing methods? What have they learned from each other? How will the knowledge be shared with larger science, arts, critical theory and writing communities? Where do public and policy makers fit into the outcomes?

- **James Gimzewski** – Professor, Chemistry Department, UCLA (California, USA)
- **Victoria Vesna** – Chair and Professor, Department of Design/Media Arts, UCLA (California, USA)

**12:45pm – 1:45pm**

**LUNCH**



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1:45pm – 2:45pm

### Medical Applications of Nanotechnology

*Location: Room 103, The Professional Development Centre (PDC)*

- **Linda Pilarski** – Professor, Oncology and Cross Cancer Institute, University of Alberta (Edmonton, AB) and **Sophia Adamia** – Ph.D. Student, Oncology Department (Edmonton, AB) - Multiple Myeloma Research and the Genetic Analysis of Cancer- Microfluidics Platforms (20 minutes)
- **David Wishart** – Associate Professor, University of Alberta (Edmonton, AB) - Programmable Adaptable Nanomaterials Electronics and Nanotechnology (20 minutes)

**Followed by Discussion**

2:45pm – 2:55pm

**STRETCH BREAK**

2:55pm – 4:45pm

### Designing with New Materials: Part One – Fabrics, Bodies, Responsive Materials and Situations

*Location: Room 103, The Professional Development Centre (PDC)*

**Co-moderated by Victoria Vesna** – Chair Professor, Department of Design/Media Arts, UCLA (California, USA)

- **Deepak Srivastava** – Senior Scientist and Technical Lead, Computational Nanotechnology, CSC/NAS NASA Ames Research Centre (California, USA) - *Pure Carbon Based Materials*
- **Joanna Berzowska** – Assistant Professor, Design Art and Digital Image/Sound, Faculty of Fine Arts, Concordia University (Montreal, PQ) - *Materials and Fashion*
- **Kathryn Saunders** – Principal and Creative Director of Public Domain Experience Design (Toronto, ON) - *Architecture*
- **Diana Domingues** – Professor, University of Caxias do Sul (Caxias do Sul, Brazil) - *Living Artificial Scapes, Virtual and Physical Spaces: Pocket Cave and Artificial Life Installation*

4:45pm – 5:00pm

**BREAK**

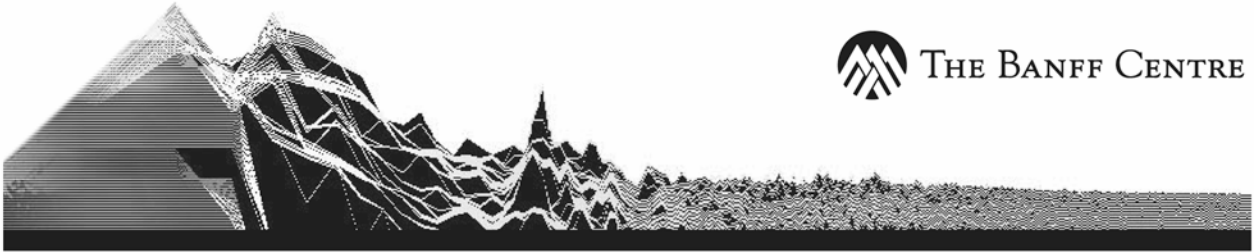
5:00pm – 5:30pm

### Imagining Applications – The Role of Small and Medium Enterprises (SME's)

*Location: Room 103, The Professional Development Centre (PDC)*

**With comments by Tom Keenan**

- **Anthony Harckham** – President, Ordino Inc. (Canmore, AB)



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5:30pm – 7:00pm  
DINNER

7:00pm – 9:00pm

**Opening Reception for Exhibit : *Reading History Backwards* - by Gisele Amantea**

*Location: The Walter Phillips Gallery, Glyde Hall*

**Curated by Anthony Kiendl** – Director, Visual Arts and Walter Phillips Gallery, The Banff Centre

**Friday, August 8th**

8:00am – 9:00am

**Technical Run Through**

*Location: Room 103, The Professional Development Centre (PDC)*

**All presenters FOR THE DAY must attend - see technical run through schedule for times**

9:00am – 9:30am

**Review of Day One**

*Location: Room 103, The Professional Development Centre (PDC)*

- **Sara Diamond** – Executive Producer, TV & New Media, Artistic Director, Media and Visual Arts, The Banff Centre

9:30am – 10:30am

**Ethics and Nanotechnology**

**Roundtable discussion with ten minute lead off per speaker**

*Location: Room 103, The Professional Development Centre (PDC)*

- **Gregor Wolbring** – Professor, Faculty of Medicine, Medical Biochemistry, University of Calgary (Calgary, AB)
- **Jim Munroe** – Proprietor, No Media Kings (Toronto, ON) - *A commentary about his concerns as a writer of science fiction*

10:30am – 10:45am

**BREAK**

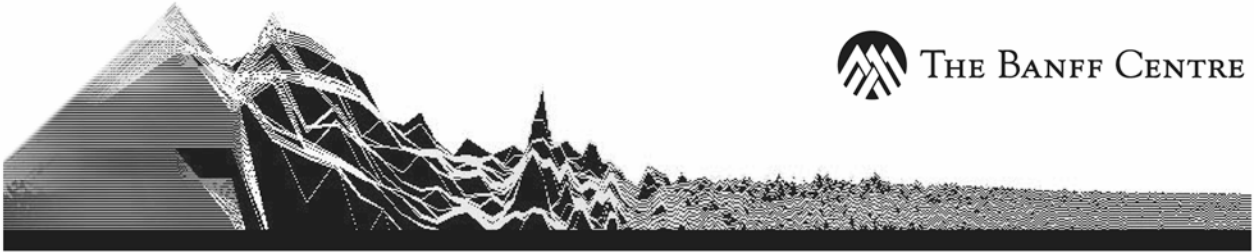
10:45am – 12:00pm

**Roundtable - Making Meaning from Science**

*Location: Room 103, The Professional Development Centre (PDC)*

**Co-moderated with Maroon Tabbal** – Principle, SynCAD Metro, Technology & Design Firm (California, USA)

Speakers are professional interpreters of science knowledge in imaginative ways to larger, diverse projects - they will speak about methods and illustrate with specific



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projects. Each of them traverses multi-disciplinarity in their own knowledge and practice. As well as their work, let's find out how they manage integration.

- **Tom Keenan** – Professor, Faculty of Continuing Education, University of Calgary (Calgary, AB) - *Science, CBC and Shad Valley*
- **Kathryn Saunders** – Principal and Creative Director of Public Domain Experience Design (Toronto, ON) - *Science Centres, Art and Architecture*
- **Ruth West** – Department of Design/Media Arts, UCLA (California, USA) - *UCLA/Li-Cor Undergraduate Genome Initiative - in silico v1.0: Ecce Homology*

**12:00pm – 1:00pm**  
**LUNCH**

**1:00pm – 2:30pm**

**Inside the Art and Science of Visualisation Technology**

*Location: A.R.T Lab and Main Hallway, The Jeanne and Peter Lougheed Building (JPL)*

**Please join us for the Grand Opening of the Advanced Research Technology Laboratory**

**2:30pm – 3:30pm**

**Electronics and Nanotechnology**

*Location: Room 103, The Professional Development Centre (PDC)*

**Co-moderated by James Gimzewski** – Professor, Chemistry Department, UCLA (California, USA)

- **John Ryan** – Director, Professor of Physics, Bionanotechnology IRC, Oxford University (Oxford, UK)
- **Andrew Kostiuik** – Staff Researcher, TRILabs (Saskatoon, SK)

**3:30pm – 3:45pm**

**Grab your stuff for the excursion!**

**3:45pm – 5:30pm**

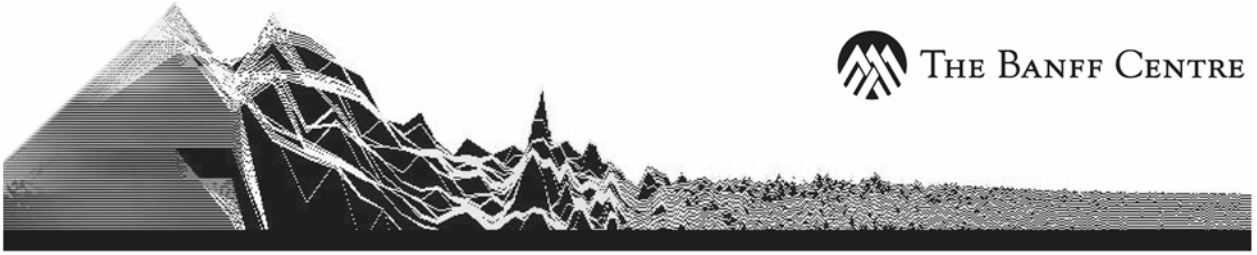
**Trip to Lake Minnewanka**

- The bus will leave from the road outside The Sally Borden Building at 3:45pm sharp.
- The bus will leave Lake Minnewanka at 5:20pm to return back to the Banff Centre.

**5:45pm – 6:45pm**

**DINNER**





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**6:45pm – 7:45pm**

**Science Fiction Reading**

*Location: Room 103, The Professional Development Centre (PDC)*

Reading and Discussion of work and ideas about Nanotechnology by writers-what is the role of science fiction in relation to invention? Ethics? Etc?

- **Nalo Hopkinson** – Writer (Toronto, ON)
- **Kathleen Goonan** – Author (Florida, USA)

**8:00pm**

**Filumena**

*Location: The Eric Harvie Theatre*

A new Canadian opera co-commissioned and co-produced by The Banff Centre and Calgary Opera.

or

**Continue Discussion**

**Saturday, August 9th**

**8:00am – 9:00am**

**Technical Run Through**

*Location: Room 103, The Professional Development Centre (PDC)*

**All presenters FOR THE DAY must attend- see technical run through schedule for times**

**9:00am – 9:15am**

**Review of Day Two**

*Location: Room 103, The Professional Development Centre (PDC)*

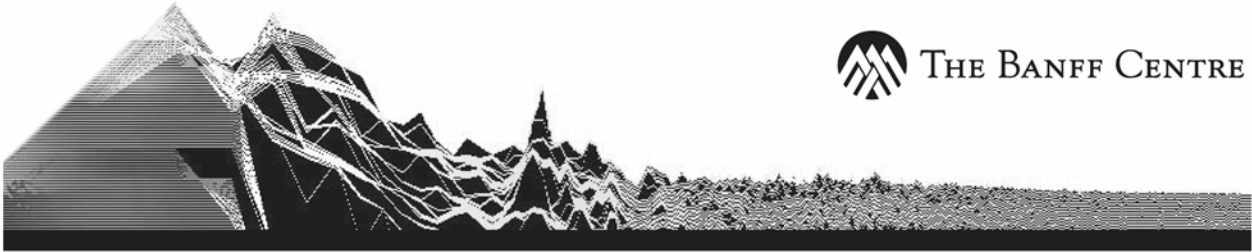
- **Sara Diamond** – Executive Producer, TV & New Media, Artistic Director, Media and Visual Arts, The Banff Centre

**9:15am – 11:05am**

**Collaborative Research: Case Study Two**

*Location: Room 103, The Professional Development Centre (PDC)*

Panelists will discuss their own areas of research in this area, sharing this with participants and linking it to the summit's themes as appropriate. Why are they collaborating? What are some of the outcomes? What are the shared or clashing methods? What have they learned from each other? How will the knowledge be shared with larger science, arts, critical theory and writing communities? Where do publics and policy makers fit into the outcomes?



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- **Mark D'Inverno** – Professor, Cavandish School of Computing, University of Westminster (London, UK)
- **Jane Prophet** – Joint Director of the Centre for Art Research, Technology and Education (CARTE), University of Westminster (London, UK)
- **Peter Ride** – Co-Director and also Senior Research Fellow at CARTE the Centre for Arts Research, Technology and Education (CARTE), University of Westminster (London, UK)
- **Robert Saunders** – Artificial Intelligence Consultant (Chiswick, UK)
- **Neil Theise** – Liver Pathologist, the Division of Digestive Diseases of Beth Israel Medical Center, New York and Professor of Pathology and Medicine, Albert Einstein College of Medicine (New York, USA)

11:05am – 11:20am  
**BREAK**

11:20am – 1:10pm

#### **The Tools of Perception - Nanotechnology**

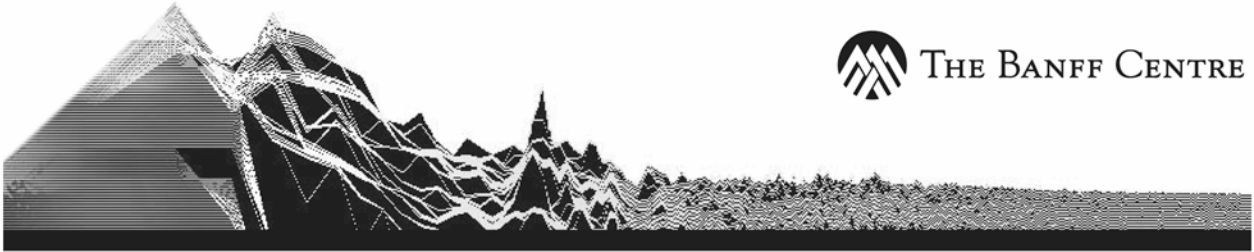
*Location: Room 103, The Professional Development Centre (PDC)*

**Co-moderated by Marc Rioux** – Research Officer, National Research Council Canada, Institute for Information Technology (Ottawa, ON)

What are the tools needed for nanotechnology research? Where do the tactile and the visual meet? How can, and is, visualisation being applied to nanotechnology? What are some examples of effective collaborations between carbon and silicon based science? What new knowledge emerges through visualization? How do artists' imagine scientific subjects in ways that invoke the physical and virtual? Where might design and interpretation fit into this picture?

- **Russell Taylor** – Research Associate Professor, Computer Science, Physics and Astronomy, Material Science, University of North Carolina at Chapel Hill (North Carolina, USA)- *Using Computers to Bring Eyes, Hands and Models into the NanoWorld*
- **Pierre Boulanger** – Professor, Department of Computing Science, University of Alberta (Edmonton, AB)
- **Tania Fraga** – Architect and Artist, Professor/Co-ordinator, Graduation Program, Visual Arts Department, University of Brasília and Associated Researcher, Polytechnic School of Engineering, University of São Paulo (Brasília, Brazil)
- **Maurice Benayoun** – Co-Founder, CITU C Création, Interactive Transdisciplinaire Universitaire (Paris, France)

1:10pm – 2:15pm  
**LUNCH**



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**2:15pm – 4:10pm**

**Designing with New Materials: Part Two – Intelligence and Ubiquity**

*Location: Room 103, The Professional Development Centre (PDC)*

**Co-Moderated by Ron Burnett** – President, Emily Carr Institute of Art and Design (Vancouver, BC)

- **Charles Ostman** – Senior Fellow, Institute for Global Futures VP, NanoElectronics and Photonics Forum and Chair of NanoSIG (California, USA) - *Theorizing Machine Agency*
- **Mary Flanagan** – Professor, Film and Media Studies, Hunter College (New York, USA) - *Fur and Other Projects: Theorizing and Making the Impossible*
- **Brian Fisher** – Associate Director, Media and Graphics Interdisciplinary Centre, University of British Columbia (Vancouver, BC) - *Cognitive Thinking and Nanotechnology*
- **Sha Xin-Wei** - Assistant Professor, School of Literature, Communication and Culture, Georgia Institute of Technology (Georgia, USA)

**4:10pm – 5:00pm**

**Summary Discussion to Prepare for Research Day with Imagining Applications**

*Location: Room 103, The Professional Development Centre (PDC)*

- **Sara Diamond** – Executive Producer, TV & New Media, Artistic Director, Media and Visual Arts, The Banff Centre
- **Mark Resch** – CEO/Onomy Labs Inc. (California, USA)

**5:00pm**

**Get your hiking gear!**

**5:10pm – 7:00pm**

**Optional: Hike up Tunnel Mountain or go relax in the pool or whirlpool**

**7:00pm – 8:00pm**

**DINNER**

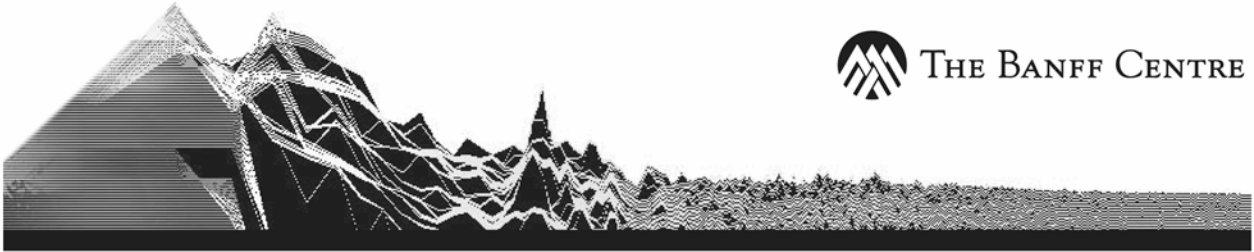
***\*Please Note: Dinner served only till 7:30pm***

**8:00pm – 12:00am**

**Party: Inside HorizonZero - Digital Art & Culture in Canada**

*Location: Max Bell Foyer and Auditorium*

Join us for a party with cash bar celebrating the first anniversary of HorizonZero, an online bilingual magazine devoted to the digital arts and culture in Canada!  
[www.horizonzero.com](http://www.horizonzero.com)



## BANFF NEW MEDIA INSTITUTE

### Sunday, August 10th

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Carbon versus Silicon: Thinking Small/  
Thinking Fast Agenda

9:00am – 10:00am

**Technical Run Through**

*Location: Room 313 The Jeanne and Peter Lougheed Building (JPL)*

**All presenters FOR THE DAY must attend- see technical run through schedule for times**

10:00am – 11:15am

**Carbon versus Silicon: How did the tides turn during C versus S?**

*Location: Room 313 The Jeanne and Peter Lougheed Building (JPL)*

What are the places of flow? Can we plot some places for ongoing research, debate, and production?

11:15am – 11:30am

**BREAK**

11:30am – 1:00pm

**Framework for Retreat Groups and Break into Small Groups**

*Location: Room 313 The Jeanne and Peter Lougheed Building (JPL)*

1:00pm – 2:00pm

**LUNCH**

*Small groups continue discussion over lunch*

2:00pm – 2:30pm

**Small Group Work**

*Location: Room 313 The Jeanne and Peter Lougheed Building (JPL)*

2:30pm – 3:00pm

**Report Back with Results**

*Location: Room 313 The Jeanne and Peter Lougheed Building (JPL)*

3:00pm – 3:15pm

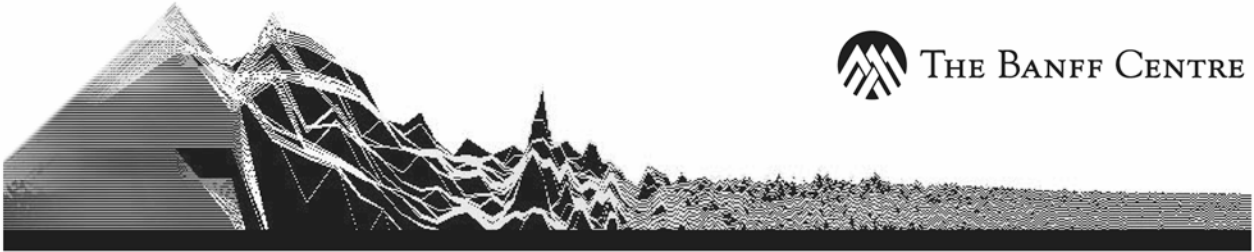
**BREAK**

3:15pm – 4:00pm

**Organizing Research Context: Institutes and Research Centres - Collaboration Perspectives**

*Location: Room 313 The Jeanne and Peter Lougheed Building (JPL)*

This informal session is intended to create an understanding of our research contexts and open the possibility of collaboration between institutions and individuals that are



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present here. What are the focal points of our institutes? These are short presentations of about 5 minutes maximum.

- **Marc Rioux** – Research Officer, National Research Council Canada, Institute for Information Technology NINT/NRC (Ottawa, ON)
- **Sara Diamond** – Executive Producer, TV & New Media, Artistic Director, Media and Visual Arts, The Banff Centre
- **James Gimzewski** – Professor, Chemistry Department, UCLA (California, USA)
- **Victoria Vesna** – Chair and Professor, Department of Design/Media Arts, UCLA (California, USA)
- **John Ryan** – Director, Professor of Physics, Bionanotechnology IRC, Oxford University (Oxford, UK)

**4:00pm – 5:00pm**

**Discussion of how to organize future research**

*Location: Room 313 The Jeanne and Peter Lougheed Building (JPL)*

**5:00pm – 5:30pm**

**Evaluation: Discussion and Forms**

*Location: Room 313 The Jeanne and Peter Lougheed Building (JPL)*

**5:30pm – 7:30pm**

**DINNER**

**8:00pm – 12:00am**

**Closing Reception at Sara Diamond's House: 502 - 2<sup>nd</sup> Street in Canmore**

- A bus to the party will depart from the road outside the Sally Borden Athletic complex (across from the Kiln Coffee Shop) at 8:00pm sharp.
- The bus will leave Sara's house at 12:00am (midnight) to return to The Banff Centre.
- There will be snacks provided, but please BYOB.
- Please have nice toes or socks! No shoes are allowed in the house.