

PROGRAM

Fourth Advanced International Colloquium on
Building the Scientific Mind
Stellenbosch, South Africa, March 7-11, 2011

Monday, March 7: Framing the debate.

- 08:30 – 09:00 Arrival participants | Getting to know each other | Registration | Collecting colloquium materials
- 09:00 – 09:15 Welcome + introductory remarks
- 09:15 – 09:45 ***Hope for a sustainable future: How one South African university is helping to create a better world.***
(Welcoming address by the Vice Rector Teaching of Stellenbosch University.)
Magda Fourie, South Africa. (Talk with brief discussion)
Stellenbosch University launched its Hope Project in 2010. Through the various initiatives that form the Hope Project the university wishes to contribute to a sustainable future for South Africa and the African continent, not only in terms of the physical world and environment, but also in terms of human and social dimensions. The address will touch on the rationale for the Hope Project and illustrate how the different initiatives contribute to creating a more sustainable future.
- 09:45 – 10:45 ***Africa's Sustainability Challenges – Is there an alternative to the traditional resource-intensive industrialisation pathway to development?*** (Opening keynote by the Director of the Sustainability Institute.)
Mark Swilling, South Africa. (Presentation with discussion)
A reference paper concerning this keynote is available at <http://www.learndev.org/dl/BtSM2011/Africa Policy Brief.pdf>.
- 10:45 – 11:15 **Break:** Coffee/tea with muffins, jam, cheese.
- 11:15 – 12:45 ***Guided tour of the Sustainability Institute and Lynedoch.***
Eve Anneck, South Africa. (Guided tour with Q&A.)
- 12:45 – 13:45 **Lunch** (organic; vegetarian)
- 13:45 – 14:00 Return to conference room in time for Skype video link with Taiwan, which starts at 14:00.
- 14:00 – 15:00 ***Technological progress and sustainability: A look at the history and future of human societies.***
Benjamin Olshin, Taiwan (virtual presentation followed by discussion).
A key theme of the BtSM conference this year, "Learning for Sustainable Futures", can be approached from a history of technology perspective, and we will use that to address two key questions:
(a) The peculiar asymptotic development of technology from the nineteenth-century to the present — can it be continued? Should it be continued?
(b) What other kinds of futures for human society might there be — that is, futures other than ones with more and more technological advances?
An accompanying slide show for this intervention is available at http://www.learndev.org/dl/BtSM2011/conference-presentation_BenjaminOlshin.pdf.
- 15:00 – 15:30 ***Building the Scientific Mind: A retrospective overview.***
Jan Visser, France. (Brief presentation as input for exploratory session after the break.)
Building the scientific mind has been a focus area for research and development of the Learning Development Institute (LDI) since the inception on the Institute in 1999. BtSM has become most prominently expressed in the biennial series of colloquia held since 2005. This talk will briefly highlight the history of BtSM, its driving motives, how these dialogues are associated with the mission and vision of LDI, and what they intend to achieve.
- 15:30 – 16:00 **Break:** Coffee/tea with biscuits.
- 16:00 – 17:30 ***Looking back; looking ahead: Interactive exploration and clarification of expectations involving past and current participants.***
Muriel Visser-Valfrey, France. (Group work and plenary discussion).
The session will be facilitated by Muriel. We will initially meet in small groups. Each group will include some who have participated in past BtSM events and others who haven't. In the group discussion, 'old' participants will share their experiences from past events and all group members together will clarify their motivations for participating in the current event and what they expect of BtSM2011. This will be followed by a plenary discussion of the findings reported by each of the groups.

Tuesday, March 8: Different perspectives of sustainability.

09:00 – 10:00

Learning for a Sustainable Future: “Loving the World and Our Children Enough. Nurturing Decidedly Different Scientific Minds, by Design.”

Stephanie Pace Marshall, USA. (Paper and discussion.)

We live in times of complex global challenges so interdependent they defy traditional modes of thinking. “Decidedly Different” scientific minds that cultivate the creativity, fluency and adaptive expertise of *integral* and *wise* thinking are fundamental to sustaining a “constructive human presence” on the earth. Learning environments must be designed to enable students to develop the habits of mind of *inquiry-based, design-based* and *systems-based thinking*. This is the cognitive context for designing STEM environments that nurture “decidedly different” scientific minds.

This presentation will: (1) frame the “new narrative” for re-imagining STEM teaching and learning, (2) describe the attributes of “decidedly different” (integral and wise) scientific minds, and (3) offer learning environment design conditions that drive the creation of a new model. In a workshop conducted in conjunction with this presentation, participants will delve more deeply into these ideas and their implications for design.

A resource paper on *Loving the world and our children enough: Nurturing 'Decidedly Different' scientific minds, by design* is available at <http://www.learndev.org/dl/BtSM2011/Marshall-ResourceDoc.pdf>.

10:00 – 10:30

The story of the Sustainability Institute and Lynedoch.

Eve Anneck, South Africa. (Presentation.)

Description awaited.

10:30 – 10:45

Changing minds; changing lives: Social and economic development of grassroots communities around national archeological parks in Brazil.

Luiza Alonso, Brazil. (Brief introduction to further explorations later in program.)

Over the past 20 years, educational and socio-economic programs have been developed by the Serra da Capivara national park in Brazil, aiming at combating poverty among the inhabitants of communities around the park and improving the sustainability of both these communities and the natural and archeological heritage in the area. Evaluation has shown that such projects failed to reach their goal. It thus became necessary to change the underlying theoretical framework and methodological practices. With a view to generating critical debate, suggestions will be put forward regarding innovative educational initiatives for the sustainable development of the communities and the preservation of the archeological heritage. One expects to discuss that experience at the Colloquium on BtSM2011 as well to consider new insights for the sustainable development of the communities and the national park conservation.

10:45 – 11:15

Break: Coffee/tea with muffins, jam, cheese.

11:15 – 12:15

Promoting dialogue between followers of different medical paradigms to combat the spread of HIV in sub-Saharan Africa.

Ralf Syring, Democratic Republic of Congo. (Presentation and discussion.)

We have started to integrate HIV related work into the cultural context of the district of Kwango in the Democratic Republic of Congo. The combination of research, intended to find out about the connotations of HIV and AIDS in communities and the terms and metaphors used by chiefs and healers to describe it and to deal with it, and information/training of biomedical personnel and healers has initiated a process of structured dialogue between followers of the different medical paradigms in the district.

12:15 – 12:45

Antibiotic stewardship for a sustainable future.

Patricia Cristofaro, USA. (Presentation and discussion.)

Almost simultaneously with the introduction of antimicrobials into medical therapy, came the development of resistance mechanisms in microorganisms. Proliferous, uncontrolled, and disorganized use of antibiotics in both medical and veterinary settings including the untargeted use of antibiotics to enable animal husbandry in overcrowded farms have now contributed to a situation in which harmful microbes can no longer be treated with common antibiotics. There are no new drug discoveries in the pipeline for certain infectious which are now spreading by worldwide travel. A new field of infectious diseases - antibiotic stewardship - is now evolving in an attempt to contain this resistance problem conserving current antibiotic efficacy for as long as possible. These concepts will be discussed during this session.

12:45 – 13:45

Lunch (organic; vegetarian)

13:45 – 14:45

Intergenerational conversations, collective wisdom and ownership in South Africa: Teachers, pupils and families engaging with the age of AIDS.

James Lees and Tania Vergnani, South Africa. (Paper followed by interactive process animated by the presenters.)

While the dominant story of AIDS remains a medical construction, in South Africa the pandemic can be understood as testimonial of the struggle many people have in protecting and promoting life – their own and others. This paper will reflect on our own fledgling work to inspire intergenerational conversations within and between families through the use of new film on HIV produced by MTV, Shuga, in the University of the Western Cape's teacher education programmes. These new conversations move beyond simply 'breaking the silence' and seek to create spaces where families and communities can animate new possibilities for themselves and begin not simply to 'own' the AIDS pandemic but to reclaim a process that values their own collective wisdom and sustains their own journeys toward the future.

14:45 – 16:45

Parallel workshops on:

- 1) *Learning for a Sustainable Future: “Loving the World and Our Children Enough. Nurturing Decidedly Different Scientific Minds, by Design”*** (facilitator Stephanie Marshall).
- 2) *Promoting dialogue between followers of different medical paradigms to combat the spread of HIV in sub-Saharan Africa*** (facilitator Ralf Syring).

15:30 – 16:00 **Coffee/tea and biscuits:** Workshop participants collect coffee/tea, biscuits.

16:45 – 18:00

Reception offered by the Learning Development Institute, hosted by Lya and Jan Visser.

Wednesday, March 9: Research and theory building in the perspective of sustainability.

09:00 – 9:15

The Sustainable Innovation Stellenbosch Network

Pieter van Heyningen, South Africa. (Brief introduction to further explorations later in program.)

The Sustainable Innovation Stellenbosch Network is an action research initiative aimed at creating a participatory network for innovation and sustainability in Technopark (Stellenbosch). The initiative also serves as an intervention to kick-start or initiate a transformation or transition of a science/business park toward sustainability, collaboration and innovation. The proposed contact/ dialogue session will be an idea generation debate and critique aimed at brainstorming ideas for putting into place measures to ensure the continuation of the SISN post project completion. As well as methods for constructing a model for replication in other regions, science and business parks.

09:15 – 10:00

The ABC (Aim, Belief, Concern) instant research question generator.

Johannes Cronjé, South Africa. (Paper and discussion.)

A frequently-encountered weakness in graduate research studies is the disconnect between the aim of the research and the actual research questions. Frequently the promise made in the introduction of a thesis is not fulfilled by the time the conclusion is written. The paper describes an application of Burrell & Morgan's four paradigms of social science research from which a set of research questions can be derived that will ensure that what a student sets out to do is aligned with the research questions, so that the research methodology can be derived from that. Two dimensions combine – the nature of science and technology, and the nature of society.

10:00 – 10:45

How do we approach practical, messy problems? A reflection on how to respond to the economic and ecological crises.

Martin de Wit, South Africa. (Paper and discussion.)

The question how to approach practical, messy problems where problems are not well-defined remains actual. The recent financial and economic crisis, as well as an emerging ecological crisis, is an opportunity to reflect on deeper questions on how to approach and inform decisions in the real world. The expectation is that we do not only learn on how to do things better, but also on how to do things differently.

10:45 – 11:15

Break: Coffee/tea with muffins, jam, cheese.

11:15 – 12:00

Feminist popular education: Exploring the edges.

Shirley Walters, South Africa. ('Fishbowl' where the lead presenter begins with the propositions, a few others are invited to be in the 'fishbowl' with her to engage immediately, and there are 2 empty chairs, which enable others to enter at any time to comment or question before returning to their seats.)

This is based on the introduction to an emergent book which is co-edited by me and Linzi Manicom. It contains 14 chapters from about 10 countries and 24 feminist popular educators. The presentation will identify the key themes that have emerged from the writings. As the reviewer of the manuscript states 'the text is highly original, and extends in multiple directions pedagogical practices that explore non-cognitive, non-linguistic, affective, intuitive and imaginal domains'.

12:00 – 12:22

Can we create a sustainable structural approach to pedagogy?

Elizabeth Jordan, Canada. (Introductory presentation to later debate and working group activities.)

Using an open discussion format attendees will be encouraged to peruse one of the challenges facing universities as they plan for "sustainability by creating structural, procedural approaches" that "create outstanding learning experiences 'efficiently'". There are a number of issues and questions: Can pedagogy be sustainable? Is sustainability even possible when dealing with what in a business model is considered a "Wicked" problem (Rittle & Webber, 1973). That is, a socially based problem which constantly changes, etc.

A resource paper on *Can we create a sustainable structural approach to pedagogy?* is available at http://www.learndev.org/dl/BtSM2011/Jordan_Can%20We%20Create%20a%20Sustainable%20Structural%20Approach%20to%20Pedagogy.pdf.

12:22 – 12:45

Learning for sustainable futures: An heuristic approach to cultural diversity and resilience.

Christine Merkel, Germany – UNESCO Commission. (Introductory presentation to later debate and working group activities.)

Resilience – the key link between biological diversity and cultural diversity? What role for learning? The link between the "two diversities" will be explored, with a special focus on the connection of diversity and resilience. What role for mimetic and cultural learning, sub- and unconscious? How to reinvent ourselves as biosphere relevant species? How to explore the zone between "things we know" and "things we don't know", the tacit, implicit and practical knowledge?

A resource paper on *Integration of culture in sustainable development* is available at http://www.learndev.org/dl/BtSM2011/Integration%20of%20Culture%20in%20sustainable%20development__%20Non%20paper%20Germany.pdf.

12:45 – 13:45

Lunch (organic; vegetarian)

13:45 – 14:15

Learning to act for a sustainable future.

Martin Gardiner, USA. (Paper and discussion.)

Humanity has responsibility and opportunity for action concerning sustainable future, but such action will depend not only on information that informs action, but also on extent of human involvement. Growing evidence implies that we humans are actors, with significant capacity to influence both our behavior and our capabilities for behavior. As we increasingly see ourselves as actors, new paths building towards sustainable futures can open. A number of such opportunities will be discussed.

14:15 – 15:30

Workshop on Research and theory building in the perspective of sustainability. Johannes Cronjé and Martin de Wit take the lead.

15:30 – 16:00

Break: Coffee/tea with biscuits.

16:00 – 17:00

Workshop on Pedagogical practices with a view to creating sustainable futures. Elizabeth Jordan and Shirley Walters take the lead.

Thursday, March 10: Building sustainable communities inspired by art, nature, science and history.

09:00 – 9:55

Sutherland reflections

Bronwyn Lace, Marcus Neustetter, Carolina Ödman Govender and Kevin Govender, South Africa.
(Presentation combined with a challenge for participants to develop methodologies in groups followed by dialogue)

The session will begin with a presentation of Sutherland and SAO, this will establish a context, we will then ask participants to break into smaller groups and tackle a specific problem in relation to the context. We will then briefly present Sutherland Reflections as a case study. The intention is for the session to end in an open dialogue in which participants can add to and critique the project as it stands thus far.

09:55 – 10:20

Can we find the next Einstein in Africa?

Carolina Ödman, South Africa. (Presentation.)

The Next Einstein Initiative of the African Institute for Mathematical Sciences (AIMS-NEI) was set up to build a critical mass of scientific and technical talent in Africa, capable of initiating change across the continent. Excellent graduates from African Universities will be trained in the centres of academic excellence that AIMS-NEI will establish based on the model of AIMS-South Africa. The graduates joining the AIMS-NEI centres share their learning of science together and develop a commitment to a better African future, while bridging cultural and national boundaries.

10:20 – 10:45

Astronomy for development.

Kevin Govender, South Africa. (Presentation.)

The International Astronomical Union, in recognition of the immense use of astronomy to stimulate development, has developed a decadal strategy entitled "Astronomy for the Developing World". At the heart of the implementation is the Global Office for Astronomy Development (GOAD) which became active on 1st March 2011. The host of this office, the South African Astronomical Observatory, has a record of using astronomy for development through the Southern African Large Telescope's Collateral Benefits Programme. Highlights from this programme as well as plans for the GOAD will be discussed in the context of using astronomy for development, especially in Africa.

10:45 – 11:15

Break: Coffee/tea with muffins, jam, cheese.

11:15 – 11:45

Promoting reasoning skills via subject focus literacy approaches.

Paul Webb, South Africa. (Presentation and discussion.)

The focus of this discussion is on selected recent South African research studies that have explored efforts to promote the discussion, writing, and arguing aspects of subject specific literacy in primary and middle schools, particularly amongst second-language learners. These studies reveal improvements in the participants' abilities to write and argue their findings, as well as statistically significant improvement in their problem solving skills.

11:45 – 12:15

Wiki as an ecological system.

Evgeny Patarakin and Vasily Burov, Russia. (Presentation and discussion.)

Ecologies and ecosystems concepts transferred from the world of biology to the social world in order to explain interrelations between different agents and their environment. The concept of knowledge ecology in modern world is closely linked with an idea of wiki as an ecological system. In this hypertext system different agents create, recycle and reuse various text blocks. We can use the wiki for a better understanding of the principles of sustainability and viability of the learning communities.

12:15 – 12:30

Libraries for sustainability.

Diana Stirling, USA. (Brief introduction to further explorations later in program.)

A library can be a vital center of community resource sharing, innovation, and access—promoting lifelong learning in ways that sustain the individual, the community, society, and the world. Please join this discussion of the current role of libraries in our communities and the future we can fashion for them.

12:30 – 12:45

Learning together the Big History: The Big Bang, Life on Earth, and the Rise of Humanity.

Premana Premadi, Indonesia. (Brief introduction to further explorations later in program.)

This round table discussion will be on the efficiency and impact of a particular mode of learning, i.e. learning together with a group by watching a series of recorded lectures followed by discussion among the learners with and without a particular expert in the group (the lecturer is not present). I shall start off with a case report from Indonesia: A group of about 20 people with various academic and professional backgrounds met every week for 3 hours to follow and discuss the series of 48 lectures on the Big History by Professor David Christian.

12:45 – 13:45

Lunch (organic; vegetarian)

13:45 – 14:30

Gaming for sustainable futures: Leveraging video gaming to develop sustainable mindsets through 'learning for complexity.'

Carlo Fabricatore, UK. (Presentation and discussion.)

The session aims at analyzing and discussing the relevance of digital games for the development of a sustainable mindset. Research evidence, game-industry wisdom and real-world examples will be analyzed and used to illustrate how digital games can promote the development of complex systemic thinking, which we believe to be crucial to build sustainable futures. The presentation will be followed by a debate involving the audience, in order to allow the convergence of different backgrounds to further enrich and extend the scope of the analysis.

14:30 – 17:00

THE GREAT DEBATE: Building sustainable communities inspired by art, nature, science and history.

14:30 – 15:30: **Working in groups** on the following themes:

- 1) Having diverse stakes in a shared problem (solving competing interests) – Bronwyn Lace / Luiza Alonso.
- 2) Sharing resources (information, documentation, knowledge, technological infrastructure and savviness) – Evgeny Patarakin / Diana Stirling
- 3) Mastering shared language for building sustainable learning communities – Paul Webb
- 4) Learning together inspired by shared appreciation and understanding – Premana Premadi

15:30 – 16:00 **Break: Coffee/tea with biscuits.**

16:00 – 17:00 **Plenary discussion** in which results of group work are being shared and further discussed.

19:00 – ????

Colloquium dinner (vegetarian as well as non-vegetarian—no pork meat) with entertainment, at the Moyo restaurant (<http://www.moyo.co.za/restaurant-moyo-stellenbosch/map.aspx>) at the Spier Wine Estate, R310 Lynedoch Road, Stellenbosch, Western Cape (-34° 1' 10.38", 18° 44' 35.95").

Friday, March 11: Learning for sustainable futures: What have we learned?

09:00 – 10:45

Parallel activities

Before the break one major workshop will be run—the one on *Gaming for sustainable futures* (see below)—in parallel with other activities decided on by the participants in the course of implementing the colloquium program.

Gaming for sustainable futures: Designing games that foster the development of sustainable mindsets.

Carlo Fabricatore, UK. (Workshop)

The workshop aims at experiencing the challenges of designing games that tackle “learning for complexity” and systems thinking. In the beginning of the workshop, experts in the fields of game design and educational gaming will explain the basic principles to design games and will analyze the main problems that are faced when designing games to foster scientific thinking. Then, participants will be organized in groups, and will be required to design a game concept especially aimed at this purpose, supported by facilitators.

Activities organized in parallel to the above workshop may consist of initiatives that emerged in the course of the dialogue that evolved over the four previous days. They could also be extensions of programmed activities that were felt to require more time. Or they could be any of the workshops and round tables for which individual participants had submitted proposals. We have tried to accommodate as much as possible of those workshops and round tables in the afternoon activities of the previous days. However, there may be aspects that were insufficiently covered. If so, then this is the opportunity to complete the work.

10:45 – 11:15

Break: Coffee/tea with muffins, jam, cheese.

11:15 – 12:40

Learning for sustainable futures: What have we learned?

Muriel Visser-Valfrey, France. (Group work and plenary discussion).

Through group activities and plenary dialogue, facilitated by Muriel, we will review and assess the impact of our collaborative work over the past four and a half days on each of us and our intentions and commitments regarding life after the colloquium.

12:40 – 12:45

Closing statement and farewell.

12:45 – 13:45

Closing lunch (organic; vegetarian).

13:45 – 16:30

The meeting facility will remain available for those who can't have enough of it and still want to hang around for post-program conversations. However, no coffee or tea will be served.