

# THE RE-EMERGENCE OF ASTRONOMY IN AFRICA:

A transdisciplinary  
interface of knowledge  
systems



10 - 11 September

Maropeng Conference Centre, Cradle of Humankind

# THE RE-EMERGENCE OF ASTRONOMY IN AFRICA – A TRANSDISCIPLINARY INTERFACE OF KNOWLEDGE SYSTEMS

Maropeng: Cradle of Humankind conference venue.

10 – 11 September 2012

## MONDAY 10 SEPTEMBER 2012

*Venue: Conference Room 2, Maropeng*

09:00 - 10:00	Registration, Tea & Coffee
10:00 - 11:30	Keynote address and conference parameters. Chair: Dr Andrew Kaniki, National Research Foundation NRF
10:00 - 10:15	<i>Welcome and Introduction:</i> Dr Olive Shisana, CEO, Human Sciences Research Council (HSRC)
10:15 – 10:45	<i>'The Square Kilometer Array (SKA) project: Implications for South Africa'</i> Keynote speaker: Ms Naledi Pandor, Minister of Science and Technology, South Africa
10:45 – 11:00	TEA
11:00 – 11:15	<i>'The Square Kilometer Array (SKA): searching for the origins of the universe'</i> Dr Adrian Tiplady, Square Kilometre Array (SKA), South Africa
11:15 – 11:30	<i>'A time line in the history of astronomy in Africa: A focus on Timbuktu manuscripts'</i> Dr Thebe Medupe, North West University, Mafikeng Campus, South Africa
11:30 – 12:45	<b>Session 1</b> <b>Global dynamics of astronomy in Africa</b> Chair: Mr Fana Jiyane: CEO. Freedom Park Trust.
11:30 – 11:45	<i>'African indigenous cosmology and development of astronomy'</i> Mr Aungh H Chabalala, Indigenous Knowledge Systems, Department of Science and Technology (DST), South Africa
11:45 – 12:00	<i>'Popularity of astronomy in China'</i> Prof. Shi Shunke, China Research Institute for Science Popularisation (CRISP), Beijing, China
12:00 – 12:15	<i>'Meta-questions, science versus extra-science on the anvil of astronomy'</i> Mr Gauhar Raza, Head: Science Communication through Multi-media, NISCAIR, CSIR, New Delhi, India
12:15 – 12:30	<i>'Participation in science'</i> Prof. Bernard Schiele, University of Quebec, Montreal, Canada
12:30 – 12:45	Discussion: Q & A
12:45 - 13:45	Lunch

13:45 – 15:00

**Session 2**

**The complexity of the cosmos**

Chair: Prof. Francis Nyamnjoh, Department of Social Anthropology, UCT

13:45 – 14:00

*'Building a platform for multi-frequency astronomy in South Africa'*.

Prof. Sergio Colafrancesco, DST SHA Research Chair, University of the Witwatersrand, South Africa

14:00 – 14:15

*'Cultures that observe and anticipatory governance'*

Ms Geci Karuri-Sebina, South African Cities Network

14:15 – 14:30

*'The first philosophers were astronomers. Fauerbach: curiosity, innovation and creativity in SA higher education policy'*.

Prof. John Higgins, Andrew W Mellon Research Professor, new Archives and Public Culture project, University of Cape Town, South Africa

14:30 – 14:45

*'Networking, standardising, harmonising and sustaining land, sea and space. Infrastructure in Africa: challenges and opportunities'*.

Prof. Mammo Muchie & Mr Seke Lukovi, Institute of Economics Research on Innovation (IERI) Tshwane University of Technology (TUT), South Africa

14:45 – 15:00

Discussion: Q & A

15:00 – 15:30

TEA

15:30 – 14:30

**Session 3**

**Cultural evolution of astronomy in Africa**

Chair: Prof. Patricia Whitelock, SALT.

15:30 – 15:45

*'Space technology and the future of agriculture in Africa'*

Dr Julius Gatune Kariuki, Africa Centre for Economic Transformation

15:45 – 16:00

*'Astronaissance: communicating astronomy & space to the African imagination'*

Mr Keith Gottschalk, Political Studies, University of the Western Cape

16:00 – 16:15

*'The development of modern astronomy in South Africa'*

Prof. Michael Feast, SAAO & Professor Emeritus of Astronomy at the University of Cape Town

16:15 – 16:30

*'The contribution of African archaeology to African knowledge systems – reflections and future prospects'*

Prof. Alinah Segobye, University of Botswana

16:30 – 16:45

*'Revisiting the Dogon and ancient Egypt's cultural contribution to astronomy - A civilizational dialogue'*.

Jeffrey Sehume, Senior Researcher, Mapungubwe Institute for Strategic Reflection (MISTRA), South Africa

16:45 – 17:00

Discussion: Q & A

17:00 – 18:00 Visit to the radio telescope at Hartebeesthoek Radio Astronomy Observatory (HartRAO) hosted by Dr Michael Gaylard, Director of HartRAO

**Venue: Maropeng**

18:30 – 22:00 Evening programme, starting with pre-dinner cocktails and ending with supper

18:30 – 18:45 '*Research policy linkages: Development imperative and democratic challenges*'  
Guest speaker: Dr Peirre Sane, Imagine Africa International, Paris

18:45 – 19:30 Poetry reading under the stars:  
Gauhar Raza, NISTADS, CSIR, India (Urdu poet)  
Keith Gottschalk, University of Western Cape, South Africa  
Prof. Pitika Ntuli, Artist  
Francis Nyamnjoh, Department of Social Anthropology, University of Cape Town

19:30 – 22:00 Dinner

**TUESDAY 11 SEPTEMBER 2012**

**09:00 – 10:30 Session 4.**  
**Celebration of astronomy today**  
Chair: Prof. Ramesh Bharuthram, DVC Academic, University of the Western Cape

09:00 – 09:15 '*Why astronomy?*'  
Prof. Patricia Whitelock, South African Astronomical Observatory (SAAO) & the University of Cape Town

09:15 – 09:30 '*Africa's contribution to astronomy: an interdisciplinary approach*'  
Prof. Habib Sy, Howard University, Washington

09:30 – 09:45 '*Bring our heads together, something will happen*'  
Prof. Alfred Z Msezane, Department of Physics, Clark Atlanta University, Fellow,  
American  
Physical Society

09:45 – 10:00 '*Marimba Ani begins her book, 'Yurugu and African-centred critique of European thought and behaviour*'  
Prof. Pitika Ntuli, Artist

10:00 – 10:15 '*Africa has the next growth pole: long-term prospects for the continent and implications for knowledge production*'.  
Dr Gengezi Mgidlana, NEPAD, Special advisor to the CEO.

10:15 – 10:30 Discussion: Q & A

10:30 - 11:00 TEA



**11:00 – 12:30 Session 5.**  
**Celebration of astronomy today – linking technology and society**  
Chair: Dr Temba Masilela, Deputy CEO Research, HSRC

- 11:00 – 11:15 '*Cosmology between past and present: human fragility, everyday life and advanced techno-science*'  
Prof. Ernst Wolff, Department of Philosophy, University of Pretoria
- 11:15 – 11:30 '*Eye on the sky: African writers and the popular imagination*'  
Prof. Francis Nyamnjoh, Department of Social Anthropology, University of Cape Town
- 11:30 – 11:45 '*Leaving the observatory: why and how astronomers should counter pseudoscience*'  
Prof. George Claassen, Department of Journalism, Stellenbosch University
- 11:45 – 12:00 '*Orientalism and cultural alienation*'  
Dr Hester du Plessis, Head, Science communication, Research Use and Impact Assessment (RIA), Human Sciences Research Council (HSRC).
- 12:00 – 12:30 Discussion: Q & A

**12:30 - 13:30 Lunch**

**13:30 – 15:30 Session 6**  
**Humanising the role of astronomy/cosmology**  
Chair: Prof. Bernard Schiele, University of UQAM, Canada

- 13:30 – 13:45 '*Gone to the Moon': indigenous knowledge, astronomy, and metaphors for girls. Puberty in KwaZulu-Natal Contexts*'  
Prof. Relebohile Moletsane, JL Dube Chair in Rural Education in the Faculty of Education, the University of KwaZulu-Natal
- 13:45 – 14:00 '*Reconnecting in the quest for cosmic unification or: whither astronomy's return in Africa*'  
Dr Leonard Martin, Mapungubwe Institute for Strategic Reflection (MISTRA)
- 14:00 – 14:15 '*Creating a climate conducive to fulfilling South Africa's science communication imperatives*'  
Ms Nicole Breen, Research Use and Impact Assessment Intern, Human Sciences Research Council
- 14:45 – 15:00 '*The SKA is the Limit? Making political memories and scientific discoveries*'  
Prof. Mike Masemola, Department of English Studies, University of South Africa
- 15:00 – 15:15 '*The opportunities falling from the skies for ICT in South Africa: How do social scientists benefit?*'  
Dr Happy Sithole, Center for High Performance Computing, CSIR
- 15:15 – 15:30 Discussion: Q & A

**15:30 – 16:00**    **Session 7**  
**Closure and the way ahead**  
Chair: Dr Temba Masilela, DCEO, HSRC

16:00 - 16:30    TEA and end of conference

16:30            Departure

**Exhibition:**    Partner institutions

**Rapporteurs:** Ms Alison Bullen

Ms Harsha Daya

Ms Valerie Fitchard

## **AIM OF THE CONFERENCE**

This conference is driven by two strategic comments. On the one hand Ms Naledi Pandor, Minister of Science and Technology, declared that South Africa, in the bid to host the Square Kilometer Array (SKA) with its world class MeerKat-telescope, will position South Africa as a world leader in astronomy research. According to the Minister '... no matter what the outcome, South Africa will be a dominant player in global radio astronomy because of MeerKat and significant South African involvement in SKA. Winning this bid is like winning the *Science World Cup* and it will bring huge investment and opportunities in the Northern Cape Province, in our country, and the eight other African countries that will host remote antenna stations. It is time for all of us to get excited and feel proud of what our scientists are doing.'

The second strategic comment addresses the debilitating situation that the social sciences are currently experiencing. According to the 2011 survey done by the Academy of Science of South Africa (ASSAF), '... the humanities within institutions of higher learning is in a state of intellectual stagnation and, singular innovations notwithstanding, has remained in this moribund condition for more than fifteen years' (ASSAF, 2011). To ensure the strategic participation of the social sciences in the celebration of a revival of astronomy research in South Africa, this conference aims to include topics related to the social sciences and humanities in celebration of African astronomy.

To facilitate these diverse comments, the Department of Science and Technology (DST) and the Human Sciences Research Council (HSRC) will co-host the conference. Presentations generated by this conference will be published as a book under the general incentive of the **African Knowledge Production Series: Philosophers of Science from Africa** at the HSRC.

## **OBJECTIVES OF THE CONFERENCE**

The intention of the conference is to bring together scholars from diverse disciplines and academic backgrounds to discuss the historical use and impact of astronomy in the development of mankind's understanding of the universe. Ancient reference to astronomy is juxtaposed with the science and technology characterising modern society. An explicit transdisciplinary approach is applied to assist in earmarking the specific challenges African intellectuals face in bringing together the meta-narratives of ancient astronomy with the science and technology that is driving the modern development of communication systems in Africa. The conference hosts speakers from the natural sciences, the social sciences and the humanities. Science communication principles facilitate the methodology of speakers addressing issues of intersection, diversion and explicit speciality in the development of astronomy.

Researchers from the SKA project reports on the substantial long term benefits for South Africa and Africa, corroborating our position as a hub for technological investment, creating local job opportunities, investment in human capital and directly increasing the uptake of science among young people. To assist in meeting government objectives, speakers at the conference were requested to give attention to the performance indicators that were identified in relation to the 'Space Science' thematic programme and Grand Challenge of the Department of S&T, South Africa:

- Generate independent earth observation high-resolution satellite data available for all of Africa from a constellation of satellites designed and manufactured in Africa
- Undertake at least one launch from South African territory in partnership with another space nations, and have in place a 20-year launch capability plan
- Specify and co-built a domestic/regional communications satellite and secured a launch date and ITU slot for its operations
- Become the preferred destination for major astronomy projects and associated international investment in construction and operations

- Constructed a powerful radio-astronomy telescope and used it for world-class projects

The Conference provides a platform for meaningful science communication building on conversations, multi-media interaction, and reflective engagement. Edutainment will be a key component of the proceedings. The Conference provides opportunities for human capital development that will span across disciplinary divides. Students were invited to attend and participate in the conference proceedings. The intention is that these students will gain a better understanding of various dimensions of astronomy, which in turn will point them to a range of possible career dimensions in fields related to science and science communication. The following four elements, regarded as essential for becoming a knowledge-based industry, is the key driver to ensure achieving future economic growth and Government's broad developmental mandate (cf. DST Ten Year Innovation Plan 2008-2018)

- Human capital development,
- Knowledge generation and exploitation,
- Knowledge infrastructure, and
- Enablers to address the 'innovation chasm' between research results and socio-economic outcomes.

## **BACKGROUND**

Astronomy is not a new field of study in Africa. History proves that astronomy, currently considered as a natural science, dates back to antiquity with origins in the philosophical, religious, mythological and astrological practices of pre-history. Nowhere is this more explicitly encountered than in the evidence found in the ancient manuscripts from Timbuktu dating back to the thirteenth century (Jeppie & Diagne, 2008). Within the manuscript collection at Timbuktu we find documented evidence of the roots of philosophy - manifested as a distinct discipline in the tradition of *falsafa* within the Muslim sciences and considered as precursor to Greek philosophy (Diagne, 2008). We also find documents containing astrological references and recordings of the stars and sun and moon cycles by ancient Muslim scholars such as Shaykh Sidi al-Mukhtar al-Kunti (1729 – 1811) (Mahamoudou, 2008). Current archaeo-astronomers are particularly interested in the manner in which these different ancient cultures studied the sky, thereby linking landscape archaeology with cognitive archaeology. The complexity of this quest obliges archaeo-astronomers to make use of interdisciplinary research information.

Due to the intertwined nature of research from the physical (natural) scientists and the social sciences it is apt to consider current research to be formulated through a transdisciplinary approach to the topic – an approach that moves beyond disciplinary methodological constraints. This is especially appropriate in the African context where virtually all policy-oriented studies now require collaborations between social, human and natural scientist. This is evident in studies on environmental change, but also in cases where public policy requires human-machine interaction, where the *social embeddedness of technologies* is at stake, or where innovation challenges previous beliefs and practices (Witrock, 2010). Therefore, the SKA project is considered as an intellectual site for collaborations between the humanities, social sciences and natural sciences.

The African philosopher Cheickh Anta Diop (in Nabudere, 2011:31) argued persuasively that the Platonian-Cartesian epistemology, supported by the Aristotelian 'corpuscle duality', set in motion a process of separation within the study of physics and brought about a clearly demarcated 'excluded middle'. The advent of quantum physics provided the unexpected 'space' to enter this 'excluded middle' by means of a transdisciplinary approach. It is within the space of the 'excluded middle' that this conference will position the diversity of contributions under the topic of astronomy.



Through inter-institutional collaboration this conference has as objective the location of SKA within the conceptual field of active equality; described by the philosopher Jacques Rancière as the obligation to address:

- Inadequacy of theories of distributive justice as equality is restricted to what institutions are obliged to give people.
- Passive equality – the creation or protection of equality by government institutions cf. taken or enacted politically by the subjects of equality.
- Subjectification – collective action out of a presupposition of equality.
- Political participation and active equality as correlated ideas.
- Passive politics – when rights structure the field of politics rather than the political moment of struggle itself.

The conference takes into account the imperative of enabling a fair democratic process of disciplinary interaction since it can be argued that democratic politics lies in what one does (the project) rather than in what one receives or is entitled to (May, 2008). “To engage in a democratic politics, in the politics of equality, is not simply to say, or to act as though one were saying, ‘we are now equal’ *it is to structure the past in the light of equality*. To act democratically is to have always been equal” (May, 2008:72).

In the African context Cheikh Anta Diop declared that: “for us, the retrieval of the Egyptian heritage in all disciplines is a first, necessary step on the way to the reconciliation of Africa’s civilizations with history. It is *a condition we must fulfill before we can design an up-to-date corpus of disciplines in the humanities and the social sciences*; the foundation for the renovation of African culture. The heritage of Greek and Roman antiquity has had a decisive impact on Western culture. Just as profoundly, the heritage of ancient Egypt will help shape the African culture we aspire to rethink and remake” (Diop 1981:12).

We find ample evidence of astronomy being mentioned by African philosophers:

- Philosophers of Alexandria, Cyrene, Carthage and Hippo (323 BC to 221 BC) i.e. Arisrtarchus who describe the earth’s rotation on its axis and its rotation around the sun in his treatise *On the Magnitude of the Distance of the Sun and the Moon*.
- The philosophical schools of Timbuktu (University of Sankore), Gao and Djenne (14th and 15th centuries AD) and the great Sudanese empires (Ghana, Mali, Gao, and Songhai).
- The plural tendencies in modern and contemporary African Philosophy: “... culturalist tendency, hermeneutic tendency, diachronic tendency, and the so-called functionalist tendency, which contemplates the integration of science and technology into African social, economic and cultural realities, while simultaneously trying to establish perspective for a new epistemology ” (Obenga, 2004:12).

Even more provocatively, the pyramids in Egypt bear testimony of the utilisation of expertise in astronomy. The pyramids, royal tombs built between 2750 BC and 1600 BC, were basically solar monuments invoking various modes of ascension such as stairways and shafts of sunlight that putatively enable the pharaohs to live in the afterlife as companions of the Sun God. The very precise north-south orientation of the construction of the pyramids was the result of precise astronomical calculations. By the time of Alexander the Great (356-323 BC), the Egyptians have already accumulated records of the observation of 832 lunar eclipses - and must have concluded easily enough that the earth was a sphere moving in space.

These brief examples serve as proof that there is a wealth of information embedded within the field of astronomy and, more specifically, archeo-astronomy. It is no secret that ancient Africans were proficient

star-gazers, and knowledge of the stellar systems formed part of their cosmology and worldview. Through their understanding of the star systems, they intuited the universal laws of nature. To them stars were not only cosmic arms of time, but also shaped their reality and day to day life like agriculture, health, education, relationships, environmental management and nation building rituals.

## **TRANSDISCIPLINARITY**

Taking the lead from a transdisciplinary approach to the topic of astronomy and considering the relevance of transdisciplinarity to policy implications for the public, private and civil society sectors, the conference on *The re-emergence of astronomy in Africa – a transdisciplinary interface of knowledge systems*, provides the opportunity to address the debilitating socio-pathology of oppression of the mind originating from the negative forces of globalisation. Such an approach is necessary to address an inchoate society such as encountered within South Africa where its past inheritance has to be remodeled to fit with the pressures of the present and its own demands.

A transdisciplinary approach provides space for the 'politics of knowledge production' in South Africa - bearing on strategies to rebuild a society fissured by structural inequality and disempowerment. It provides opportune space for the inclusion of knowledge production histories within current change and transformation frameworks. Acknowledging that global evolution of knowledge has a link in influencing local knowledge paradigm-dimensions, transdisciplinarity affords a forum for putting into practice the imperatives of the Constitution.

To empower the participants in the conference to bridge the epistemological gap between the natural and social sciences and humanities we might have to consider some of the following challenges:

- We will need to 'dare' in a qualitative manner as the space for new knowledge is already being generated through various other sources.
- Daring also means going into the history of ideas that configured the various 'Africas' over time and space.
- Daring means unpacking the ethnicising and restrictions on notions of universality as it emerged in the Western world.
- Unpacking notions of 'mindset' and tradition means deconstructing sources that are at the root of language normalisation and ideology (MISTRA).

## **THE ROLE OF SCIENCE COMMUNICATION RESEARCH AS FACILITATOR BETWEEN THE SCIENCES AND INDIGENOUS KNOWLEDGE SYSTEMS.**

Science communication research as well as Public Understanding of Science (PUS) research takes a comprehensive view of 'science' which is inclusive of the social sciences, the natural sciences and the humanities. One of the marker discussions of science communication falls under the broader topic of 'science and society'. This topic, in turn, addresses the key problem that arises from the interaction between science and the public(s) and the relation between science and common sense (also referred to as Indigenous Knowledge Systems –IKS). With debates ranging from philosophical aspects to empirical research, questions are posed regarding the 'epistemic gap' between science and common sense (IKS). In these debates certain traits are emerging:

- A tradition of debunking false perceptions created between science and IKS (where IKS is considered to be situated in the place of superstition, half-knowledge, ignorance and misunderstandings).
- IKS becomes a focus of intellectual concern and the target of interventions.
- IKS serves as a resource of inspiration and provides oversight and legitimacy.

This conference gives high priority to the role of indigenous knowledge in its interface with science communication and the natural sciences. The intellectual capital developed through participation between science and society as well as between science and IKS, steers the theoretical, epistemological and methodological perspectives best suited for science communication research in South Africa in specific and in Africa in general.

The conference brings together participants from diverse research fields to deliberate on the re-emergence of astronomy in Africa through the transdisciplinary interface of knowledge systems. On the one hand presentations will cover the wealth of knowledge embedded in the area of ancient astronomy. On the other hand, through the participation of the natural sciences, presentations will focus on the current three international telescopes in the Northern Cape Karoo. The first is SALT, an optical telescope near Sutherland. The second is the C-Band All Sky Survey (C-BASS), which is a radio telescope. The third is PAPER (Precision Array to Probe the Epoch of Reionisation), which is a radio telescope.

A number of African countries are developing initiatives in astronomy:

- Egypt is refurbishing its 1.9-metre optical telescope.
- Mauritius has the Mauritius Radio Telescope, which was constructed in the early 1990s.
- South Africa and Mauritius are jointly building a low frequency array with telescope stations in both countries.
- Burkina Faso is installing a 1-metre optical telescope.
- Ethiopia is considering installing a 2-metre robotic optical/infrared telescope and increasing the number of universities to support astronomy.
- Kenya and Mozambique, as a result of the African bid for the SKA, have started an astronomy programme at the University of Nairobi and University of Eduardo Mondlane respectively.
- Ghana has started conversion of a communications antenna into a radio telescope.
- Nigeria is erecting a 25-metre radio telescope and has expressed an interest in taking part in the African VLBI network.
- Namibia has the HESS telescope, which a high-energy telescope owned by an international consortium.
- South Africa has completed a 7-dish array called Karoo Array Telescope (KAT-7)

Considering the rich heritage of countries such as India and China, researchers following a transdisciplinary approach, with a special interest in archaeo-astronomy, astronomy and science communication will present their work. The consortium partners include the Human Sciences Research Council (Dr Temba Masilela), the Department of Science and Technology (three programmes, Dr Sagren Moodley, Dr Tshepo Seekoe and Ankh - Hlupheka Chabalala), the National Research Foundation (Dr Andrew Kaniki ), Codesria, the Freedom Park Trust (Mr Fana Jiyane), the Mapungubwe Institute for Strategic Reflection (Dr Leonard Martin), Africa Institute of South Africa (Dr Patrick Matlou) and the Academy of Sciences of South Africa (Dr Xola Mati).

## **BIBLIOGRAPHY:**

- Diagne, S. 2008. Toward an intellectual history of West Africa: the meaning of Timbuktu. In: Jeppie,S.& Diagne, S. (eds) 2008. *The meanings of Timbuktu*. Cape Town:HSRC. Pp: 19 – 27.
- Diop, Cheikh Anta. 1981. *Civilization or Barbarism: An Authentic Anthropology*. Chicago: Lawrence Hill Books
- Jeppie,S.& Diagne, S. (eds) 2008. *The meanings of Timbuktu*. Cape Town:HSRC.
- Mahamoudou, M. 2009. The works of Shaykh Sidi al-Mukhtar al-Kunti. In: Jeppie,S.& Diagne, S. (eds) 2008. *The meanings of Timbuktu*. Cape Town: HSRC. Pp: 193 – 212.
- May, T. 2008. *The Political Thought of Jacques Ranciere: Creating Equality*. University Park, PA: Pennsylvania State University Press.

MISTRA: Mapungubwe Institute for Strategic Reflection

Nabudere, D. 2011. *Afrikology, philosophy and wholeness: an epistemology*. Pretoria: Africa Institute of South Africa.

Obenga, T. 2004. *African philosophy: the Pharaonic period, 2780-330 BC*. Popenguine: Per Ankh

Wittrock, B. 2010. "Shifting involvements: rethinking the social, the human and the natural" in World Social Science Report: Knowledge Divides. Paris: Unesco Publishing.

## **ABSTRACTS AND BIOGRAPHIES**

### **MONDAY 10 SEPTEMBER 2012**

09:00 - 10:00 Registration, Tea & Coffee

**10:00 - 11:30 KEYNOTE ADDRESS AND CONFERENCE PARAMETERS.**

**CHAIR: DR ANDREW KANIKI, NATIONAL RESEARCH FOUNDATION NRF**

**DR ANDREW KANIKI** is the Executive Director of Knowledge Fields Development at the National Research Foundation (NRF). The directorate is primarily responsible for the management of research funding programmes, including the centres of excellence. Prior to joining the NRF in November 2002, Andrew was a lecturer (1992-1995) and then Professor of Information studies (1996-2002) at the University of Natal (now University of KwaZulu-Natal).

In addition, he worked as Vice Chancellor and Acting Deputy Vice Chancellor (Academic) at the University of Natal between 2000 and 2002. He holds a PhD and Agricultural Information Specialist Certificate from the University of Pittsburgh, USA. He is past president of the Southern African Research and Innovation Management Association (SARIMA), member of the Higher Education Quality Committee (HEQC) and Library and Information Association of South Africa (LISA). He serves on the Research Output Evaluation Panel of the Department of Higher Education and Training (DHET) and served on the Standing Committee of the Section on Education and Training of the International Federation of Library Associations and Institutions (IFLA) between 1997-2001.

**10:00 - 10:15 WELCOME AND INTRODUCTION:**

**DR OLIVE SHISANA, CEO, HUMAN SCIENCES RESEARCH COUNCIL (HSRC)**

**DR OLIVE SHISANA** was the first woman and the first black woman to be appointed as CEO of the Human Sciences Research Council on 1 August 2005. She is a public health professional with extensive research, management and policy development experience spanning over 19 years.

Before accepting the position as CEO, she served as Executive Director of the Social Aspects of HIV/AIDS and Health research programme at the HSRC, where she headed a national programme and Africa-wide network on the Social Aspects of HIV/AIDS and Health Research Alliance (SAHARA). She has also served as professor and head of department of Health Systems Management and Policy at the Medical University of Southern Africa.

She has global health experience, obtained while serving as executive director of the WHO's Family and Community Health, where she oversaw HIV/AIDS, reproductive health, women's health and child and youth development programmes. At a national level, Dr Shisana served as director general of the South African Department of Health, the first woman to head the national health services. She had previously served as a specialist scientist at the South African Medical Research Council.

She co-ordinated the establishment of the School of Public Health at the University of the Western Cape, which has been in operation since 1993. She also served as the Chief Statistical Advisor to the District of Columbia, responsible for public health, mental health and social services research. Dr Shisana has addressed a number of global and international meetings such as the 49th World Health Assembly as chairperson of one of the committees, the 4th International Conference on Health Promotion, the Development Committee of the European Union Parliament, the Committee for Special Session of the

United Nations General Assembly in the follow-up to the World Summit for Children, and a meeting of the US Congressional Brain Trust, where she spoke on HIV/AIDS.

Dr Shisana obtained her DSc in behavioural sciences at the Johns Hopkins University, School of Public Health, an institution that admitted her to the Society of Scholars - an honour given to public health graduates who have made significant contribution to public health.

She is also a founding member of the South African Academy of Sciences. Over the last five years, Dr Shisana was the principal investigator and main author of several reports emanating from large studies, and has written numerous chapters in books and articles in scientific journals.

**10:15 – 10:45     ‘THE SQUARE KILOMETER ARRAY (SKA) PROJECT: IMPLICATIONS FOR SOUTH AFRICA’**

**KEYNOTE SPEAKER: MS NALEDI PANDOR, MINISTER OF SCIENCE AND TECHNOLOGY, SOUTH AFRICA**

**Ms NALEDI PANDOR** is the Minister of Science and Technology of the Republic of South Africa since 11 May 2009 and the previous Minister of Education. She is also a member of the National Executive Committee of the African National Congress (ANC) since 2002 and a Member of Parliament since 1994.

She matriculated from Gabarone Secondary School in Botswana and completed her MA in Education, University of London and an MA in General Linguistics, University of Stellenbosch in 1997. She started her career as a school teacher in Ernest Bevin School, London and in Gaborone, Botswana, followed by holding senior lecturer positions at the Taung College of Education, the University of Bophuthatswana, and the University of Cape Town.

During her career she chaired various institutions, namely the Union of Democratic Staff Association at the University of Bophuthatswana, Western Cape School Building Trust, the Tertiary Education Fund of South Africa (TEFSA), the Western Cape National Executive Committee (NEC) of the National Education Coordinating Committee, the National Council of Provinces, and the ANC Athlone Central Branch.

She was also executive chair of the Desmond Tutu Education Trust and held leadership positions in the Joint Education Trust Board of Trustees, served on the Portfolio Committee on Education as an ANC MP, and as a convener of a sub-committee on higher education, ANC Whip and an ANC Deputy Chief Whip in the National Assembly, is a member of the ANC National Executive Committee and a member of sub-committees on Education and Communications. She also performs as Chancellor of Cape Technikon, and as a member of the Council of the University of Fort Hare,

10:45 – 11:00     TEA

**11:00 – 11:15     ‘THE SQUARE KILOMETER ARRAY (SKA): SEARCHING FOR THE ORIGINS OF THE UNIVERSE’**

**DR ADRIAN TIPLADY, SQUARE KILOMETRE ARRAY (SKA) SOUTH AFRICA**

The Square Kilometre Array (SKA) Project is mankind’s quest to build the largest, and most sensitive, radio telescope in history. This next-generation scientific facility will probe the very beginnings of the universe to answer the most fundamental questions facing science today: What is Dark Matter? What is Dark Energy? What are the laws of nature, and how did they guide the evolution of the first stars and galaxies? Are we alone?

South Africa, along with eight other African countries, is leading the race to host this giant facility as well as in the development of scientific understanding and technological innovation. This talk will look at all



aspects of this international project - from what we will discover in the future, to what we have already put on the ground in preparation of hosting the SKA.

**BIOGRAPHICAL OVERVIEW OF DR ADRIAN TIPLADY:**

He obtained degrees in Computer Science, Physics and Electronics, Musicology and Compositional Techniques; Honours degree in Telecommunications; and a PhD in Radio Astronomy. Since 2005 he has worked in the South African SKA Project Office, and is currently the SKA Site Bid Manager, responsible for Africa's bid to host the SKA. He was also responsible for the establishment of a protected radio astronomy area, known as the Astronomy Advantage Area, and a member of a number of international committees responsible for spectrum management, including: European Science Foundation expert Committee on Radio Astronomy Frequencies (CRAF), the International Scientific Committee on the Allocation of Frequencies for Space Science and Radio Astronomy (IUCAF), and the International Telecommunications Union Working Party 7D. In 2011 he was nominated as the Mail & Guardian's Top 200 Young People to Have Lunch With; and is a recent finalist in the inaugural Ikusasa Awards.

**11:15 – 11:30     ‘A TIME LINE IN THE HISTORY OF ASTRONOMY IN AFRICA: A FOCUS ON TIMBUKTU MANUSCRIPTS’  
DR THEBE MEDUPE, NORTH WEST UNIVERSITY (MAFIKENG CAMPUS)**

The involvement of African people in astronomy is often reduced to nothing more than reciting star-lore. It is believed that African astronomy only became scientific when settlers arrived in the Cape and erected an observatory there in 1820. In this talk I will show that indeed this story is incomplete, and that in fact, one can begin to build a time-line of the involvement of African peoples in astronomy going back many millennia. I will discuss how African people used stars in the past, and how, through their interaction with Islam West Africans, studied mathematical astronomy at their schools and used it in their daily lives. I will also say something about the history of astronomy in modern South Africa, from measuring distances to stars in the 19th century to the building of the SALT telescope and the future with the Square kilometer array (SKA).

**BIOGRAPHICAL OVERVIEW OF DR THEBE RODNEY MEDUPE:**

When Halley's comet passed near the earth in 1986, it sparked off Thebe Medupe's interest in astronomy. At the age of 13 he built his first telescope and made his own map of the moon in a small South African village near Mafikeng. After matriculating at Mmabatho High School, he proceeded to study physics and astronomy at the University of Cape Town, where he earned his MSc (cum laude) in astrophysics. He obtained his doctorate in astrophysics from the University of Cape Town in December 2002.

Associate Professor Medupe has authored and co-authored 33 scientific research papers for publication: 21 refereed journals, 12 conference proceedings and three other publications. He has edited two academic books, written two children books on astronomy and a high-school level book on history of astronomy in Africa.

His research focuses on the use of sound waves, generated inside stars, to probe the interiors of a particular class of pulsating stars (astero-seismology). Part of his doctoral research was conducted at the Institute of Physics and Astronomy at the University of Aarhus in Denmark.

He presented a special invited lecture in London at the invitation of the Royal Society of Britain in 2006. His Timbuktu Science Project was featured in the New Scientist magazine in 2006, and Associate Professor Medupe was a featured scientist in the 'Science in Society' section of *New Scientist* magazine.

He is currently an associate Professor at the North West University (Mafikeng Campus), working and continuing his research at the University. He is also a research fellow at SAAO - the South African Astronomical Observatory in Cape Town. He is involved in various committees on astronomy in South Africa, and is in the executive committee of a special programme for training students on MSc (astronomy) called the National Astrophysics and Space Science Programme (NASSP).

Medupe founded the NASSP-SAAO winter school whose aim is to introduce astrophysics to students from previously Black universities. NWU (Mafikeng campus) is a member of NASSP and Medupe is a representative of NWU (Mafikeng) campus at the NASSP. He heads a project called Timbuktu Science Project whose aim is to search for science in the ancient manuscripts from Timbuktu, an ancient city in Mali (West Africa). He has contributed a chapter in a book on African Cosmos by the Museum of African Art of the Smithsonian Institute in Washington.

His life story became part of the film called Cosmic Africa in which he visited remote villages in Africa, searching for ordinary villager's knowledge about the night sky. Cosmic Africa is his first film project. He has also contributed to a new film on the Timbuktu manuscripts.

**11:30 – 12:45    SESSION 1**

**GLOBAL DYNAMICS OF ASTRONOMY IN AFRICA**

**CHAIR: MR FANA JIYANE: CEO. FREEDOM PARK TRUST.**

**MR FANA JIYANE** is CEO of Freedom Park, a national monument based in Pretoria, and devoted to the celebration of South Africa's freedom and humanity, and honouring those who made sacrifices in the struggle for liberation. Mr Jiyane holds a BA Hons in Sociology from the University of the Witwatersrand, Johannesburg, and an MPhil in Development Studies from the Institute of Development Studies at the University of Sussex in the United Kingdom. He has over 10 years of senior management experience in the heritage sector and is a former CEO of the Cradle of Humankind World Heritage Site and the Dinokeng tourism project.

**11:30 – 11:45    'AFRICAN INDIGENOUS COSMOLOGY AND DEVELOPMENT OF ASTRONOMY'**

**MR AUNKH H CHABALALA, INDIGENOUS KNOWLEDGE SYSTEMS, DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST), SOUTH AFRICA**

It is no secret that Ancient Africans were proficient star-gazers, and the knowledge of the stellar systems formed part of their cosmology and worldview. Through their understanding of the star systems, they intuited the universal laws of nature. To them, stars were not only cosmic arms of time, but also shaped their reality and day to day life like agriculture, health, education, relationships, environmental management and nation building rituals.

The early Bantu national also demonstrated this knowledge, through stone circles representing major constellations or what is known as the zodiac in the ancient science of astrology. These stone clocks were used to mark four cardinal directions, four seasons, solstices and equinoxes. In order to pass this knowledge to the younger generations, their skillfully developed an educational system or teaching tools by relating their knowledge of the stars in relation to animals - hence 'zoo-diac' or circle of animals.

Early settlers of the Nile Valley just as their counterparts in the south built stone cycles in what was later known as Axum and Napta Playa. These sites are similar as those in Waterval Boven, Mpumalanga and countless other areas in Southern Africa. These also served the same purpose ~ to chronicle time, world

natural events and mark the beginning to critical spiritual festivals or rituals for the benefit of the community.

Those known as 'dwellers at the source of the Nile' in current Uganda, Tanzania and Ethiopia looked at the return of the Orion Constellation and Sirius B as a sign of seasonal flooding. Africans in Ancient Egypt perfected the science of astronomy in constructing all their important monuments like temples and pyramids. It is therefore critical to recognise the role of IKS in modern astronomy.

**BIOGRAPHICAL OVERVIEW OF AUNKH CHABALALA:**

Aunkh Chabalala is the Director of Knowledge Development and Innovation in Indigenous Knowledge Systems (IKS) within the Department of Science and Technology. He worked as a researcher at the Medical Research Council and as a Natural Medical Scientist at the national Department of Health focusing on epidemiology, infectious diseases and health systems research.

He is currently responsible for research, development and innovation with special interest in African traditional medicines, cosmeceuticals and nutraceuticals. He has special interest in emerging sciences and their interface with ancient knowledge systems.

**11:45 – 12:00**    **'POPULARITY OF ASTRONOMY IN CHINA'.**

**PROF. SHI SHUNKE, CHINA RESEARCH INSTITUTE FOR SCIENCE POPULARIZATION (CRISP), BEIJING, CHINA.**

Of many of the modern sciences, two branches have special impacts on the ordinary Chinese people and the popularising effect of the knowledge is extraordinarily successful. One is astronomy, the other is evolution. The paper particularly focuses on the former.

Astronomy, like other brilliant cultures in many parts of the world, has a very long history in China. Although today's astronomy has developed into a complicated science and difficult for lay people to imagine and understand, the ancient application of the knowledge was rather popular under the context of Chinese culture. Learning about the heavens through memorization had a close relation to the daily life of the local people, but the use of the knowledge was basically confined in two aspects, i.e., used in constructing calendars which was of great importance through the history, and used in political or military affairs as a tool to read the will of the Almighty. Along with the astronomical achievements, there were also many misled or superstitious beliefs as the hidden law of the movement of the heaven lay beyond the understanding of the people over the time.

Modern knowledge of astronomy was brought to Chinese people after it was imported from the West. It was included in the text books of school children, written in popular books for the public, and popularised through various channels of communication. Chinese people did not find it difficult to change their views of the heaven to the movements of the heaven bodies. Absurd explanations of the old beliefs became nonsense. People do not hesitate to follow the new discoveries of the astronomical scientists. However, in recent years, astrology became quite popular among the youngsters. Many of them assume that the sayings of astrology work well and would rather link their personality and life to the descriptions of astrology.

Chinese people love astronomy and have little difficulty to accept its knowledge. The reason behind this is primarily because of the local cultural heritage as well as the massive popularisation of the advanced knowledge about astronomy.

#### **BIBLIOGRAPHICAL OVERVIEW OF PROF. SHI SHUNKE:**

Prof. Shi Shunke was born in 1954, and is head of the division of Theoretical Studies on Science Popularisation of the China Research Institute for Science Popularisation, with which he has been working since 1988. His main research interest concerns the history of science popularisation and the theoretical study of S & T communication development around the world. He published articles on science popularisation, edited *The English-Chinese Lexical Dictionary*, collated *A Chinese-English Dictionary of Classic and Current Expressions*, published *Brief Introduction to Science Popularization in USA*, and collaborated in publishing the books *At the Human Scale* as co-author, *Communicating Science in Social Contexts* and *Science Communication in the World* as co-editor. He helped organise the Beijing PCST Working Symposium in 2005 and the International Forum on PCST Studies in Beijing in 2010 and 2011.

**12:00 – 12:15 'META-QUESTIONS, SCIENCE VERSUS EXTRA-SCIENCE ON THE ANVIL OF ASTRONOMY'**

**MR GAUHAR RAZA, HEAD: SCIENCE COMMUNICATION THROUGH MULTI-MEDIA, NISCAIR, CSIR, NEW DELHI, INDIA**

Development of the ability to raise question and seek answers is an important turning point on the trajectory of human evolution. Humans through the ages have repeatedly asked a large number of the same or similar questions and developed conceptual frameworks to explain the natural reality. The divergence between science and extra-science is embedded in both the nature of these questions and the methods of seeking the answers.

Science poses meta-questions, which quintessentially begin with 'how' and questions beginning with 'why' often lead to a perception about 'truth' that is frozen in time and constituted thought structures which are designated as extra science. This paper deals with the nature of questions centred upon science and the path/s that it follows to seek answers. The aim is to demonstrate how certain conclusions change with time. The history of the development of astronomy amply shows that the conclusions drawn, conceptual models constructed and reality configured is always tentative and is subject to revision. Those structures of thought, which could be designated as extra-science (for example, astrology) propound a non-universal yet final 'truth' legitimised through socially constructed power structures. The composition of these power structures is culturally determined.

Any critical examination of a power structure or methodology of constructing reality is seen as potential threat to entire 'complex of thought'. Conversely, scientific endeavour does not draw its legitimacy from any authority; in turn, it progresses by relentlessly examining and re-examining the conceptual frameworks and models constructed by the previous generation of scientific community. The author proposes that this characteristic of science, when imbibed by a common citizen, constitutes the bedrock of 'scientific temper'.

Empirical data clearly shows that the cosmological worldview of a common citizen contains elements of science and extra-science, which quite peacefully exist within their mental spaces. The objective of science communication is to reduce the space occupied by the extra-science and enlarge the area that inhibits scientific rationality. Communicators who have taken the burden of spreading 'scientific temper' while communicating science must convey the essence of this structural difference between science and extra-science.

#### **BIOGRAPHICAL BACKGROUND OF GAUHAR RAZA**

Gauhar Raza is Chief Scientist and Head of Science Communication through Multi-Media, CSIR-NISCAIR, India. His area of specialisation is Public Understanding of Science (PUS) with a focus on the conceptualization of scientific temper. He has carried out many large-scale national and cross-

country survey studies in India and participated in a number of PUS international studies including South Africa and China.

He has published 8 books, more than 20 research papers and 24 documentary films. He was awarded the Urdu Academy Award for Contribution to Popular Science Writing in 2003. He is a renowned Urdu Poet and his collection of Poems *Jazbon Ki Lau Tez Karo* was honoured with the *Creative Literature Award*, Hindi Academy, Delhi, 1999-2000. He also received the award *Best Expert for Educational Films* by the University Grants Commission, India, 1999. He was the founder Director of the Jahangirabad Media Institute (JMI) where he trained a number of award winning media students over the past few years.

**12:15 – 12:30**     **'PARTICIPATION IN SCIENCE'**

**PROF. BERNARD SCHIELE, UNIVERSITY OF UQAM, MONTREAL, CANADA.**

To understand participation in science in today's globalised world, at least four parameters need to be mobilised: environmental awareness, the impact of technosciences on society, the growth of communication and the economic imperative. Globally, their effects are felt everywhere. Individually they matter less than their collective interaction. They have transformed the way knowledge is produced, circulated, acquired and mobilised. This evolution leads to the growing ambivalence of the public toward sciences. Thus, participation of social actors needs to be reconceptualised to accommodate the multiplicity of experiences, perspectives and interests of participating groups.

#### **BIOGRAPHICAL BACKGROUND OF BERNARD SCHIELE**

*Bernard Schiele* (Ph. D., University of Montreal, 1979), is a researcher at the Interuniversity Research Centre on Science and Technology at UQAM, Professor of Communication at the Faculty of Communication and Professor for the Joint Doctoral Program (PhD) in Communications at UQAM, the University of Montreal and Concordia University. He frequently teaches and lectures in North America, Europe and Asia. He is a member of several national and international committees and is a regular consultant on scientific culture matters to governmental bodies and public organizations including the Auditor General of Canada and the Conseil de la Science et de la Technologie du Québec. He is also a founding member and current member of the scientific committee of the PCST network (Poitiers, 1989). As such he was involved in the *PCST-9 2006 Seoul International Conference (Scientific Culture for Global Citizenship)*, the *PCST-10 Malmö (Sweden) International Conference (Bridges to the Future)* the *PCST-11 2010 New Delhi* and is in the next *PCST-12 2012 Florence*. A former director and founder of Interuniversity Research Centre on Science and Technology (CIRST/IRCST), his ongoing research work concerns the role and impact of museums and media on the dissemination of science and culture information. His specific focus in recent years has been the study of science museums. He has directed many research projects. He is also a consultant on scientific museology and science dissemination for various museums and organisations.

He has organised many international conferences on science literacy, including: in 1982 and 1983 *International Roundtables on Representations*, in 1989 *Faire voir, Faire savoir – la muséologie scientifique au présent*, in 1994 (*PCST-3*) *When Science Becomes Culture*, in 1998, *Class, Laboratory, Industry, Cyberspace*, and in 2000 *International Seminar on the New Territories of Scientific and Technological Culture*. He was, with Cheng Donghong and Jenni Metcalfe, co-chairperson of the 2005 *Beijing PCST Working Symposium (Strategic Issues in Science and Technology Communication)*.

He published in collaboration with colleagues *The Rise of Environmentalism in Museums* (1993), *When Science Becomes Culture (World Survey of Scientific Culture)* (1994), with Emlyn H. Koster *Science Centers for this Century* (2000) (translated in French and Chinese), *Le Musée de Sciences* (2001), *Patrimoines et Identités* (2002), with Réal Jantzen *Les territoires de la culture scientifique* (2003), and with

Cheng Donghong and Jenni Metcalfe (in collaboration with Michel Claessens, Toss Gascoigne, Shi Shunke) *At the Human Scale – International Practices in Science Communication* (2006).

He has published lately *Communicating Science in Social Contexts – New models, new practices* (Springer, 2008) (in collaboration with colleagues). He has also published numerous articles on these topics and taken part in many national and international conferences.

He recently organised with Michel Claessens (EU) a PCST workshop in Venice (January 2007), he was a keynote speaker at the *Sciences et société en mutation* Conference (CNRS, Paris, Feb. 2007), the *International Indicators of Science and the Public*, Royal Society (Royal Society, London, Nov. 2007), *European Forum on Science Journalism* (European Commission, Barcelona, Dec. 2007), *Bridges to the Future* (PCST-10, Malmö, June 2008), *The 6th Asia-Pacific Symposium on Press and Scientific and Social Progress* (Beijing, Nov. 2008), *International Forum of the Sci-Tech Museums* (Beijing, Sep. 2009) and *Social Value of Science Center* (Guangzhou, Sep 2009).

He has chaired for five years the International Scientific Advisory Committee for the New China Science and Technology Museum which opened recently (September 2009). Lately he organised with CRISP the International Conference on the retrospect and prospect of PCST studies and a workshop on related topics (Beijing, May 2010).

He was the opening keynote speaker at the *International Conference on Science Communication for Scientific Temper* held in New Delhi, January 2012. His latest book co-edited with Michel Claessens and Shi Shunke, *Science Communication in the World: Practices, Theories and Trends* (Springer) has just been released). He is now working with colleagues to organise the next PCST 13 conference in Brazil (2014).

12:30 – 12:45 Discussion: Q & A

12:45 - 13:45 Lunch

**13:45 – 15:00** **SESSION 2**

**THE COMPLEXITY OF THE COSMOS**

**CHAIR: PROF. FRANCIS NYAMNJOH, DEPARTMENT OF SOCIAL ANTHROPOLOGY, UCT**

**13:45 – 14:00** **'BUILDING A PLATFORM FOR MULTI-FREQUENCY ASTRONOMY IN SOUTH AFRICA'.**

**PROF. SERGIO COLAFRANCESCO (DST SHA RESEARCH CHAIR WITS).**

South Africa will host the largest radio telescope ever conceived, the SKA, and this project will put the country at the centre of the African and international attention in radioastronomy, astrophysics and cosmology. The synergy with other two major astronomical facilities in the region, the SALT optical telescope in South Africa and the HESS gamma-ray experiment in Namibia, will further enhance the role of South Africa as a leading country in astronomical research by allowing building the largest platform for multi-frequency astronomy on the Earth.

We discuss here the status, the perspectives and the relevance of this new scientific vision for astronomy in (South) Africa.

**BIOGRAPHICAL OVERVIEW OF PROF. SERGIO COLAFRANCESCO:**

His career started in 1991 as astronomer at the Rome Astronomical Observatory, and I am now a full professor in Radio Astronomy with a DST/NRF SKA Research Chair at the School of Physics of the Wits University. He is an associate scientist at INAF & ASI (Italy) and associated Professor at the University of



Rome La Sapienza. He is qualified as professor in astrophysics and particle physics in Italy and in France. He developed the attitude of a 'visionary' scientist tackling with the relevant and timely problems in modern research and aiming to build, through their analysis and solutions, a wide and deep scientific vision of a world-class research activity in a multi-disciplinary, multi-frequency and multi-experiment context.

His main research activities involve: Dark Matter search in cosmic structures, the astrophysics of Large Scale Structures, galaxy clusters and of their plasma content (thermal & non-thermal plasma, cosmic rays, magnetic fields, AGN feedback, the SZ effect, X-ray & gamma-ray emission), the astrophysics of radiogalaxies and blazars, the role of high-E phenomena and magnetic fields in the evolution of cosmic structures, the origin of cosmic rays, and a general attitude to open new directions in the astrophysical research (like, e.g., the studies of light propagation, orbital angular momentum, quantum space-time effect).

He is currently pursuing the use of the deepest Radio Astronomical observations (obtained e.g. with SKA and MeerKAT) to unveil the structure, origin and evolution of the universe and of its sub-structures, the nature of Dark Matter, the origin of cosmic magnetism, the multi-scale evolution of galaxy clusters and large-scale structures, the nature of the most powerful objects in the universe (blazars, radiogalaxies), the nature and evolution of galaxies and their outflows, the origin of cosmic rays and the nature of the highest-E particle events in the universe.

In these respects, he is involved in wide, intensive scientific collaborations with activities in various theoretical and data analysis projects. He provides theoretical support to various (ground-based and space-borne) experiments operating from radio to gamma-ray frequencies: MeerKAT, SKA, RADIOASTRON, OLIMPO, PLANCK, CORÉ, MILLIMETRON, NuSTAR, DUAL, AGILE, Fermi, HESS and CTA. He is also pursuing a scientific strategy aimed at exploiting the powerful and wide application of the correlation between radio and gamma ray studies of cosmic sources, developing a strategic activity between radio (MeerKAT, SKA) and gamma-ray experiments (HESS, CTA) in the South African geographical context.

The relevance of his scientific research is largely recognised in cosmology, particle-astrophysics, radio and mm astronomy, plasma astrophysics and high-E astrophysics, with a high degree of research innovation and originality. The impact of his research can be quantified by having more than 350 scientific publications, 157 of which are in peer-review journals, and more than 50 invited reviews. My scientific production received more than 4900 citations, with an h-index of 38 (normalised h-index of 15).

Among memberships and awards, he has been a member of the Astronomy Research Council of the Italian Ministry for University & Research (1994-1999) and coordinator of the panel Large Scale Structure for the X-ray satellite project WFXRT (1999), member of the Time Allocation Committee of the X-ray satellite ASTRO-E (1999), Director of the Education & Public Outreach division of the Rome Astronomical Observatory (2000-2005), author of a NASA/AIP Press Conference on the first gamma-rays from clusters of galaxies: Baltimore-USA, April 5, 2001, Associate Scientist of the Italian National Institute for Nuclear Physics (since 1999), Chairman of the INAF Education & Outreach activities for the Venus Transit (2004), Associate Researcher at CNRS (France, 2003-2009), Science Coordinator of the ASI Science Data Centre (2007-2010), Member of the AGILE Mission Board (since 2007) - a mission Team that has been recently awarded the AAS ROSSI Prize in Astrophysics. I also served as Project Scientist for the Italian Space Agency (ASDC, LARES mission), Science coordinator for the SAGACE space project (2008), Scientific Coordinator for the MILLIMETRON project (since 2008) and for the ASI-ROSCOSMOS space programs. He is also a member of the MILLIMETRON International Science Committee and Management Committee, and Co-PI of the MILLIMETRON Science Data Centre.

He is a referee for the NRF, the Italian Ministry of University & Research, Astrophysical Journal, Astronomy & Astrophysics, Monthly Notices of the Royal Astronomical Society, Nature, Astrophys. Lett. & Comm., JCAP, IoP, Phys.Rev, Phys.Lett, and other professional scientific journals.

**14:00 – 14:15**     ***'CULTURES THAT OBSERVE AND ANTICIPATORY GOVERNANCE'***  
**MS GECI KARURI-SEBINA, SOUTH AFRICAN CITIES NETWORK**

The concept of 'anticipatory governance' as described by Leon Fuerth refers to '...a system of institutions, rules and norms that provide a way to use foresight, networks and feedback for the purpose of reducing risk, and to increase capacity to respond to events at earlier rather than later stages of their development.'

There have existed several nations or cultures with observatory functions or interests over time (in the western world, these have ranged e.g. from Galileo, Copernicus and Ptolemy, to the US Naval Observatory, the Mayan Yucatán Observatory in Mexico, the observatory in Zürich, etc.). This paper will explore how this undertaking is deemed to have affected their societies and/or humanity if at all. The author then seeks to explore what some possible scenarios might be for how the SKA could affect South/African cultures or futures. Might we get closer to 'anticipatory governance,' and what could that mean for our societies / humanity?

**BIOGRAPHICAL BACKGROUND OF GECI KARURI-SEBINA**

Geci Karuri-Sebina joined South African Cities Network as the Executive Manager: Programmes in 2011. Prior to that, she was a specialist at the National Treasury.

Geci has worked with numerous knowledge organisations, including the CSIR, HSRC, and the Institute for Economic Research on Innovation in policy and development planning research. She holds Master's degrees in Urban Planning and in Architecture & Urban Design, both from the University of California Los Angeles (UCLA). She is currently a doctoral candidate in planning and innovation studies with Wits.

**14:15 – 14:30**     ***'THE FIRST PHILOSOPHERS WERE ASTRONOMERS. FAUERBACH: CURIOSITY, INNOVATION AND CREATIVITY IN SA HIGHER EDUCATION POLICY'***  
**PROF. JOHN HIGGINS, ANDREW W MELLON RESEARCH PROFESSOR, NEW ARCHIVES AND PUBLIC CULTURE PROJECT, UNIVERSITY OF CAPE TOWN (UCT)**

Innovation has become a keyword in much of contemporary policy, and how to foster it stands at the centre of higher education debate, both globally and locally. As with any keyword, there are both narrow and broader definitions of the scope and meaning of the term. This paper celebrates the success of the SKA project as one that embodies the broadest meanings of innovation. It turns in the first instance to consider the German philosopher Ludwig Feuerbach's claim – in the *Essence of Christianity* – that the 'first philosophers were astronomers', and the ways in which Feuerbach's discussion emphasizes the role of curiosity and creativity in science. Part Two of the paper briefly contrasts narrow and broad views of innovation in contemporary policy, and follows Manuel Castells in arguing that innovation is best regarded in broad terms if the social functions of higher education are to be properly respected, and due acknowledgement given to curiosity and creativity. The paper concludes with some brief remarks concerning the idea of 'social innovation' in the recent South African Science, Technology and Innovation Landscape Report.

#### **BIOGRAPHICAL BACKGROUND OF PROF. JOHN HIGGINS**

John Higgins is currently Professor of English at the University of Cape Town. He was one of the first human scientists to be awarded an A-rating by the National Research Foundation, and was elected a fellow of UCT in 2003 and a member of the Academy of Science in South Africa in 2009.

His monograph, *Raymond Williams: Literature, Marxism and Cultural Materialism* (Routledge 1999) won both the Altron National Book Award and the UCT Book Prize; and Blackwell published his Raymond Williams Reader in 2001.

He was founding editor of the influential journal, *Pretexts: literary and cultural studies* (1989-2003), and was granted an Award of Excellence by The Cape Tercentenary Foundation for his services to literature and culture in South Africa in 2000. His main research interests are in contemporary literary and cultural theory, and debates in and around the politics of higher education. He is currently completing two books, *Marx the Scribbler* and *Academic Freedom in the New South Africa*.

He has several times been a Visiting Professor at Columbia University in New York and the International University in Germany, as well as at the University of Johannesburg, Wits and the (former) UNITRAN, and is a regular contributor on higher education matters to the Mail and Guardian, Business Day and World University News.

Recently published work includes: 'Even the dead will not be safe': On Dis(re)membering Williams' in *On Raymond Williams*, eds. Larry Grossberg, Roman Horak, and Monika Seidl, London and New York: Routledge 2010; 'King's as College' in *A Book of King's*, ed. Karl Sabbagh, London: Third Millennium 2010; 'On Representation: Citizenship and Critique in Marx and Said', in *Re-imagining the Social: critique, theory and post-apartheid society*, Eds. Peter Vale and Heather Jacklin, Durban: University of Kwazulu-Natal Press 2009; and a research report for ASSAf's Consensus Panel Study on the Humanities, 'Making the Case for the Humanities in South Africa' (2011).

**14:30 – 14:45** **'NETWORKING, STANDARDISING, HARMONISING AND SUSTAINING LAND, SEA AND SPACE. INFRASTRUCTURE IN AFRICA: CHALLENGES AND OPPORTUNITIES'**

**PROF. MAMMO MUCHIE & MR SEKE LUKOVI, TSHWANE UNIVERSITY OF TECHNOLOGY (TUT)**

Only with greatest simplification and for the sake of convenience can we say 'Africa'. In reality, except as a geographical application, Africa does not exist. (Kyszard Kapuscinski: *The Shadow of the Sun: My African life*, Penguin books, 2002). For Africa to exist there must be a strong effort to create a comprehensive system of infrastructure. To date the African effort to interconnect with predictable and well managed infrastructure remains poor. It needs to change. Africa needs a networked road system. It needs a networked railway system. It needs a networked telecommunication system. It needs to develop a networked infrastructure that interlinks the Africa land, air, and sea making it easier for an African integrated economic system to evolve.

Creating networked industries in land, air, space can make mobility of people and goods and services to be transported in land, air, sea and telecommunication. The networking of industry requires the networking of economics and politics. It is not easy to run an African railway system without networking and coordinating policy where the sharing of the costs and the gains are both just and fair. Thus research on how practically networked industries like railways, roads, telecommunications, water, agriculture, navigation, metrology and space produce can be built as African wide infrastructures involve discovering how the various states can coordinate the policies needed to do them well.

Two critical opportunities have emerged in Africa now. The first is the opportunity that is open with South Africa assuming leadership of the Africa Union. It matters how this opportunity is translated by concentrating how infrastructural networking, standardisation and harmonisation in a sustainable manner can be laid by South Africa giving the leadership by getting the AU to spread it across Africa.

The second is the SKA, the square kilometres array radio telescope which will be used to explore the spatial universe, the stars, galaxies, the dark matter and astrophysical processes. Knowledge related to unified field theory to understand not just how the universe works the way it does but also why it works will be explored. This research and opportunity has now been won by South Africa's DST successful bidding. Now the real challenge is to get all of Africa behind this SKA exploration on the one hand and for South Africa to be open and welcome primarily other Africa first before inviting others.

The only risk that Africans avoided to date is to take the risk to take the risk of uniting! That risk must not be stated. It must be demonstrated so that all can be persuaded that the benefit is more in uniting than in remaining divided. The paper will explore both the challenges and opportunities of building strong infrastructure by networking the politics and economics of Africa to manage the networking of land, sea and space infrastructure.

#### **BIOGRAPHICAL BACKGROUND OF PROFESSOR MUCHIE**

Professor Muchie holds a PhD in Science, Technology, Innovation for development (STI4D) at the University of Sussex. He is currently a DST/NRF Research Professor of Innovation Studies at the Institute of Economics Research on Innovation (IERI) at Tshwane University of Technology, and is an NRF rated Research Professor. He concurrently is a professor at Development and International Relations (DIR) at Aalborg University. He is a senior research associate at the SLPTMD Programme at Oxford University.

He has held various positions, including the Director of the Research Programme on Civil Society and African Integration at the then University of Kwa Zulu-Natal, Honorary Professor at Jiaxing University in China, Assistant Professor in Amsterdam University, Visiting Professor in Carlton College, USA, Principal Lecturer at Middlesex University, Professor at Aalborg University and Lecturer at Cambridge University.

He teamed up with the founders of the Globalics initiative to start the new relationship between Northern and Southern researchers by focusing research on the challenges of building African innovation systems. Thus Africa has been put first in highlighting the Globalics foundation of a new field on Innovation and Development. ([www.globalics.org](http://www.globalics.org)). He is a scientific Board member of Globalics and the Globalics Academy. He started and is Chief editor of the African Journal on Science, Technology, Innovation and Development that has been founded in 2009 ([www.ajstid.com](http://www.ajstid.com)). He also helped to found the African Globalics Doctoral Academy that has also been founded in 2009 (<http://agda.uonb.ac.ke>). He is a scientific board member of the network that connects North Africa, with the Middle East and southern Europe ([www.medalics.org](http://www.medalics.org)). Perhaps one of the most significant contributions to promote the emerging field on innovation studies in Africa was the South African Research Chairs Initiative. (SARChI). The first chair on innovation studies supported by the DST/NRF in South Africa was awarded to Prof. Muchie to promote doctoral and post-doctoral research in Africa. He is also a founding scientific advisor to the African Solar network ([www.ansole.org](http://www.ansole.org)). He is chairman of the Network of Ethiopian scholars ([www.nesglobal.org](http://www.nesglobal.org)) and is chide editor of the open access electronic journal The Ethiopian Electronic Journal for Research & Innovation Foresight (Ee-JRIF.).

He is editor of the *Globalics Journal of Innovation and Development* (published by Routledge, [www.globalics.org](http://www.globalics.org)), and the *Journal of Agriculture and Economic Development*, associate Editor of the *Journal of Economics and Institutions*, University of Malaysia and others.

He was appointed as a scientific and academic advisor to the local e-Governance research that involved ten African countries on ICT4D funded by IDRC and managed by CAFRAD. He was also appointed as a consultant on UNESCO's higher education, Research and Knowledge forum. He has served as a post-doctoral mentor in the NRF national postdoctoral Forum. His abiding interest is to see Africa fully free and united by contributing through science, knowledge, research and high quality training distinguished with originality and relevance.

Professor Muchie has widely published in the areas of: (i) International political economy and the emergence of new world orders, (ii) Broad based development studies, (iii) The foundation of an African system of innovation, and (iv) Comparative regional research on technology and development. Since 1985, he has produced over 200 publications, including books, chapters in books, articles in internationally accredited journals and entries in institutional publications.

#### **BIOGRAPHICA BACKGROUND OF LUKOVI SEKE**

*Lukovi Seke* is from the Democratic Republic of Congo (DRC). He joined NEPAD in April 2007 as Programme Research Assistant for the African Science, Technology and Innovation Indicators (ASTII) Initiative, one of the programmes of the Africa's Science and Technology Consolidated Plan of Action (CPA). The programme allows African Union (AU) member states to produce accurate and internationally comparable science, technology and innovation indicators.

He is a Master's graduate in Economics of Trade and Investment (University Pretoria) with a Bachelor (Hons) degree in Mathematical Economics (University of Kinshasa).

From October 1999 to January 2005 he worked as web manager and editor for the electronic journal desk of an important Congolese private Media group and was also involved in various civil society organisation activities at the national, regional and international level. Currently is a doctoral student at Tshwane University of Technology (TUT), linking Innovation and space science and technologies (e.g. earth observation, satellite applications) to sustainable development in the SADC region.

14:45 – 15:00 Discussion: Q & A

15:00 – 15:30 TEA

**15:30 – 14:30 SESSION 3**

#### **CULTURAL EVOLUTION OF ASTRONOMY IN AFRICA**

**CHAIR: PROF. PATRICIA WHITELOCK, SALT.**

**PATRICIA WHITELOCK** is Director of the South African Astronomical Observatory (SAAO) and a Professor in the Astronomy Cosmology and Gravity Centre of the University of Cape Town. She is on the Council of the CDS in Strasbourg (France) and the steering committee of the International Astronomical Union (IAU) Global Office of Astronomy for Development (OAD). She has in the past been President of IAU Division VII (Galactic System) and Commission 33 (Structure and Dynamics of the Galactic System). Prof. Whitelock chairs the steering committee for the SA National Astrophysics and Space Science Programme (NASSP), she is a fellow of the Royal Society of South Africa, a member of the Academy of Science of South Africa, a foreign associate of the Royal Astronomical Society (UK) and an honorary member and past President of the South African Institute of Physics. Her research work has focused on the late stages of stellar evolution and on the use of pulsating stars as extragalactic distance indicators and tracers of Galactic structure.

**15:30 – 15:45**     **'SPACE TECHNOLOGY AND THE FUTURE OF AGRICULTURE IN AFRICA'**

**DR JULIUS GATUNE KARIUKI, AFRICA CENTRE FOR ECONOMIC TRANSFORMATION**

Agriculture remains the backbone of many economies in Africa despite having the lowest levels of productivity of any region in the world. Today Africa is not self-sufficient in food. Further, as the world approaches the 9 billion people mark in 2050, there is worry about the future global food security in face of dwindling land and water resources.

With the largest uncultivated arable land in the world Africa is now seen as the potential breadbasket of the world in the future. However many challenges remain in particular how to improve productivity of agriculture and also mobilise the huge resources needed to open new lands for agriculture and also the capacity to manage the land sustainably

The paper will look at the trends in agriculture and explore the drivers of the future of agriculture in Africa. It will in particular examine what role space technology can play in shaping drivers of agriculture with keen eye on how space technology can help in improving productivity and also in managing agricultural resources sustainably.

**BIOGRAPHICAL BACKGROUND TO DR JULIUS GATUNE**

Dr Julius Gatune is a Policy Advisor at the African Centre for Economic Transformation (ACET), where he does research on issues critical to economic transformation and provides advice to government on how to transformation their economies. He also works on issues of long-term planning with a particular interest in modeling long-term futures of Africa. As part of this work he is involved in a global project that is mapping the future of poverty across the world specifically doing trends monitoring in West Africa.

Prior to joining ACET Dr Gatune worked with the Frederick S Pardee centre for study Longer Range Futures at Boston University and the Frederick S Pardee Centre for International Futures at the University of Denver working on futures of Africa. He also worked at Mckinsey & Co at Johannesburg South Africa office as a management consultant.

He holds a PhD in Policy Analysis at the Pardee RAND Graduate School and Master's in Computer Science at the University of Cambridge. He also obtained a BSc in Civil Engineering from the University of Nairobi.

**15:45 – 16:00**     **'ASTRONAISSANCE: COMMUNICATING ASTRONOMY & SPACE TO THE AFRICAN IMAGINATION'**

**MR KEITH GOTTSCHALK, POLITICAL STUDIES, UNIVERSITY OF THE WESTERN CAPE**

Astronaissance neatly conceptualises the crossover between the African Renaissance, the revival of astronomy in Africa, and the rise of astronautics and cognate space sciences. Story-telling, painting, engraving, writing, and above all, viewing the heavens above, have always been among the strategies for communicating this excitement and wonder. Today the internet, learned societies, media, and public outreach projects are crucial when a majority of Africa's people for the first time live under the light-polluted skies of our continent's towns and cities. Space-related products and services are woven into the fabric of our daily life as never before. Policy-makers and allocators of resources need to see as essential to their strategy communicating to Africa's citizens, voters, and taxpayers the necessity of Astronomy, Astronautics, and the space sciences.

**BIOGRAPHICAL BACKGROUND OF KEITH GOTTSCHALK**

Keith Gottschalk is in the Political Studies Department at the University of the Western Cape. He was the 2005-2006 chair of the Cape Centre of the Astronomical Society of Southern Africa, and also served on



the policy sub-committee of the Space Affairs Council of South Africa, a statutory entity in the DTI. Keith serves on the executive committee of the South African Space Association; is a fellow of the British Planetary Society; and is a member of the Friends of the Cape Town Observatory. His space-related publications appear in *Astropolitics*, *African Skies*, and in the *MNASSA*. A dozen of his poems on astronomy and astronautics are on-line at <http://www.astronautix.com/poems/index.htm>

**16:00 – 16:15**     ***'THE DEVELOPMENT OF MODERN ASTRONOMY IN SOUTH AFRICA'***

**PROF. MICHAEL FEAST, SAAO & PROFESSOR EMERITUS OF ASTRONOMY AT THE UNIVERSITY OF CAPE TOWN**

Although the roots of astronomy go back a long way, modern astronomy and physical science generally originated, or at least began a massive expansion, in the Scientific Revolution of 17th Century Europe. This science knows no frontiers and is now global. Thus modern astronomy in South Africa has until quite recently been primarily the work of individuals and institutions funded and controlled from outside the country. How this originated and developed will be described.

It established South Africa internationally as a prime site for astronomical work but probably made rather little impact on South Africans generally. However, it formed a small core on which the massive expansion to a truly South African astronomy is taking place. This development will not only position South Africa to become a world leader in scientific work but will draw bright minds into science and technology generally and, equally important, will diffuse some knowledge of science and the scientific method throughout the population

**BIOGRAPHICAL BACKGROUND OF PROF. MICHAEL FEAST**

Prof. Michael Feast is the former director of the South African Astronomical Observatory (SAAO). He is currently an Honorary Professor at the University of Cape Town and a Senior Research Associate at SAAO. He is a foreign fellow of the Royal Astronomical Society (London) and an editor of their main journal. He holds a PhD in Physics from Imperial College (London) and an honorary DSc from the University of Cape Town. He is a former vice-president of the International Astronomical Union

**16:15 – 16:30**     ***'THE CONTRIBUTION OF AFRICAN ARCHAEOLOGY TO AFRICAN KNOWLEDGE SYSTEMS – REFLECTIONS AND FUTURE PROSPECTS'***

**PROF. ALINAH SEGOBYE, UNIVERSITY OF BOTSWANA)**

Over the last 50 years African archaeology has contributed to the expansion of knowledge about human origins and early human civilisations both within the African continent and globally. African archaeology has also grown into several scholarly traditions which have become part of the global discourses on culture and development. In particular, archaeology has contributed to our understanding of the complexity of the subject of knowledge systems particularly research on the historiography of Africa's past. Clearly, the process of knowledge development in Africa has privileged the different colonizing cultures which have come to form part of the tapestry of cultures and peoples of Africa since the origins of human kind. However, Western forms of knowledge have received a more dominant and dominating part of this tapestry as a result of the Europe's ascendance in scientific knowledge development in the 19th century.

Recent research, both within African archaeology and other disciplines, has begun to uncover the diversity and antiquity of knowledge systems developed within Africa over centuries which has not hitherto been taken into account in the writing of Africa's past - particularly in discourses of sciences. This paper will seek to outline the contributions made by African archaeology as a discipline, to the study of knowledge systems and in particular draw attention to the role of African civilizations in contributing to the study of astronomy and the sciences. It will conclude by highlighting the importance

of multi-disciplinary and transdisciplinary research in uncovering knowledge about African societies and culture through time which has not been given attention in scientific research scholarship until recently. The paper will advocate for research particularly in the area of indigenous and traditional knowledge systems and methodologies as a way to enrich our current understanding of African knowledge systems in a global context.

#### **BIOGRAPHICAL BACKGROUND OF PROF. ALINAH KELO SEGOBYE**

Prof. Alinah Kelo Segobye is an academic with over 25 years of teaching and research experience at the University of Botswana (www.ub.bw). She is currently Professor of Archaeology at the University of Botswana and serves as the Coordinator of the Master's in Development Practice Program in the School of Graduate Studies. She trained at the University of Botswana and the University of Cambridge, UK. She has undertaken research in the areas of heritage studies and development in Africa. She has also worked in the area of HIV/AIDS and indigenous knowledge systems. Segobye has worked as a consultant for the African Comprehensive HIV/AIDS Partnerships (ACHAP) directing the Leadership Development Project.

Prof. Segobye is a senior research fellow at the University of South Africa (UNISA) and has been a visiting research fellow at the Australian National University (1995), the University of Cambridge (Wolfson College 2004/5) and University of California at Berkeley (2005/6) where she was a visiting Fulbright Scholar. She was a Mellon Research Fellow at Stanford University in 2009.

Prof. Segobye has served as an advisor, facilitator and expert for a number of international organizations including UNESCO, the African Union and African Futures Institute. She is a founding member of a number of local and international organizations including OCPA (The Observatory of Cultural Policies in Africa) and has served as a member of the Botswana National Cultural Council.

She is Vice President of Botswana Post Board of Directors. She sits on the national committees of the UNESCO Intangible Cultural Heritage Convention Committee and the World Heritage Committee for Botswana. She retired as president of the Pan African Association of Archaeology and Related Studies (PAA) in 2010.

**16:30 – 16:45**     ***'REVISITING THE DOGON AND ANCIENT EGYPT'S CULTURAL CONTRIBUTION TO ASTRONOMY – A CIVILIZATIONAL DIALOGUE'***

**MR JEFFREY SEHUME, SENIOR RESEARCHER, MAPUNGBWE INSTITUTE FOR STRATEGIC REFLECTION (MISTRA)**

The presentation will argue for the proposition that late 20th-21st science and technology has seemingly assumed singular rationality divorced from the purpose which it should normatively serve, i.e., conceive and apply repeatable knowledge for human and environmental progress.

The consequences have been dire, comprising of a Gandhian 'science without humanity', differentiation of knowledge systems according to racial canons, artificial divisions brought about by globalisation and information and technology revolutions, and ego-centred knowledge divorced from the natural ecosystems. This is mainly a consequence of the choices made in the historical movement from the pre-Axial age (where myth and tribal logic dominated) to Karl Jaspers' Axial age (circa 800-200 BCE) where the nature-humankind bond was severed in favour of the individual awareness.

With modern science and technology hemmed in in the imperial politics of difference – inclusion and exclusion – between the North and South, black and white, civilized and uncivilised, what is required is the consideration of a post-Axial age based on interconnection and joint problem-solving mechanisms.

The interconnected, pluralistic and non-homocentric worldviews defined Dogon and ancient Egyptian science/astronomy in which human cognition was not comprehended independent of the solar space but seen as an outcome of holistic coexistence. These civilizations and their epistemological bases highlight the direct interface of humanity with nature, other and self, subject and object, physical and metaphysical or spiritual realms plus the recognition of Dani Nabudere's 'community sites of knowledge'. Such an understanding enables the emergence of Swidler's 'deabsolutized' and contingent truth(s) about science and technology and their essential link to the development of solutions to humanity and nature's problems.

#### **BIOGRAPHICAL BACKGROUND OF JEFFREY SEHUME**

Jeffrey Sehume completed his under- and post-graduate studies at the University of Witwatersrand. He taught at Rhodes University (Grahamstown campus), AFDA Media College, and Fort Hare University. Jeffrey worked in The Presidency as a researcher and speechwriter before joining the Mapungubwe Institute for Strategic Reflection (MISTRA) in 2010 where he is coordinating two 2011/12 projects titled: The concept and application of transdisciplinarity and The rise and decline of the Mapungubwe (and Other Africa) civilisations; he is currently preparing to coordinate the 2012/13 project on the Chinese civilisation.

16:45 – 17:00 Discussion: Q & A

17:20 – 18:30 Visit to the Radio telescope at Hartebeesthoek Radio Astronomy Observatory (HartRAO) hosted by Dr Michael Gaylard, Director of HartRAO

18:30 – 22:00 Evening programme  
Pre-dinner cocktail and welcome  
Venue: Maropeng

**18:30 – 18:45** *RESEARCH POLICY LINKAGES: DEVELOPMENT IMPÉRATIVE AND DEMOCRATIC CHALLENGES*  
**GUEST SPEAKER: DR PIERRE SANÉ, IMAGINE AFRICA INTERNATIONAL, PARIS**

#### **BIOGRAPHICAL BACKGROUND OF DR PIERRE SANÉ**

Dr Pierre Sané is President of Imagine Africa International, a new Think Tank dedicated to fostering the links between research and policy in Africa and a Managing Partner of Imagine Africa Consult which specializes in Corporate Social Responsibility. He was previously UNESCO's Assistant Director-General for Social and Human Sciences (2001-2011). Prior to this, from 1992 to 2001, he held the office of Secretary General of Amnesty International (AI).

For 15 years prior to joining Amnesty International, he worked in the field of international development and research serving successively as Regional Controller, International Director of Policy and Budget, and Regional Director (West and Central Africa) of the International Development Research Centre (Canada).

Pierre Sané studied for a doctorate in Political science at Carleton University, Ottawa, Canada; he holds an M.Sc. in Public Administration and Public Policy from the London School of Economics; he is a qualified chartered accountant and holds an MBA from the École supérieure de commerce et d'administration des entreprises de Bordeaux (France). He has published extensively on development and human rights issues. He is a Board Member of the UN Global Compact, of the United Nations University/CRIS, of the West Africa Institute. He is presently a Distinguished Visiting Professor at Doshisha University in Kyoto (Japan).

18:45 – 19:40 *Poetry reading:* Gauhar Raza, NISTADS, CSIR, India and Prof. Keith Gottschalk, University of Western Cape, South Africa, Prof. Pitika Ntuli, Artist and Prof. Francis Nyamnjoh, Department of Social Anthropology, University of Cape Town

19:40 – 22:00 Dinner

## **TUESDAY 11 SEPTEMBER 2012**

**Venue: Maropeng: Cradle of Humankind conference venue.**

**09:00 – 10:30** SESSION 4.

**CELEBRATION OF ASTRONOMY TODAY**

**CHAIR: PROF. RAMESH BHARUTHRAM, DVC ACADEMIC, UNIVERSITY OF THE WESTERN CAPE**

### **BIOGRAPHICAL BACKGROUND OF PROFESSOR RAMESH BHARUTHRAM**

Professor Ramesh Bharuthram was appointed Deputy Vice Chancellor (Academic) at the University of Western Cape (UWC) in January 2008. He obtained his PhD in theoretical Plasma Physics from the University of Natal in 1980. He has served tertiary education in South Africa for more than 37 years in several capacities - at the University of Durban-Westville from laboratory assistant to head of the School of Physics, Dean of the Faculty of Science and Acting Deputy Vice Chancellor; as Director: Research at the M L Sultan Technikon (1998 – 2002) and the University of KwaZulu-Natal (2002 – 2005). He previously held the position of Dean of the Faculty of Science at the University of Witwatersrand, Johannesburg (2006-07).

He has published more than 100 research articles in journals of international standing and been a visiting professor at the Central University, Hyderabad, India and University of California, San Diego, USA. In 1986 and 1991 he was a postdoctoral fellow at Ruhr Universität Bochum, Germany as a recipient of the prestigious Alexander von Humboldt Fellowship. His research in the recent past has focused on fluctuation phenomena in the near-Earth space environment.

Apart from his position at UWC Prof. Bharuthram has been appointed as the Head of the Astronomy by the Minister of Science and Technology, which is tasked to advise on the future governance model for astronomy in South Africa, as well as the development of a long-term strategic plan for astronomy.

**09:00 – 09:15** **'WHY ASTRONOMY?'**

**PROF. PATRICIA WHITELOCK, SOUTH AFRICAN ASTRONOMICAL OBSERVATORY (SAAO) & THE UNIVERSITY OF CAPE TOWN**

Young people are attracted to astronomy for a variety of reasons, but often because they have a burning desire to understand the universe in which they find themselves - specifically, to understand how it all started, how stars, like the sun, and planets, like the earth, formed, and how all these things change and evolve over time.

Humans need to explore their environment, and they will do so mentally if they can't do it physically; such exploration is driven by our innate curiosity. However, no government will invest large sums of money simply to allow people to indulge their curiosity. Thus, the reasons why people do astronomy and the reasons why they fund astronomy are usually very different.

In this paper I explore the ways in which society benefits from astronomy, in both developed and developing countries and why investment in astronomy is so worthwhile. When the 'green light' was

given for the construction of the Southern African Large Telescope (SALT) the South African Astronomical Observatory (SAAO) was given a challenge to ensure that SALT was not simply a research tool for an elite group of scientists, but that it would produce distinct and substantial benefits in the development of people, technology and the economy.

One consequence of this was the SALT Collateral Benefits Plan, which I will describe, and a very considerable broadening of the SAAO's mandate. From this grew a strong South African involvement in 2009: the International Year of Astronomy (IYA). The IYA was such a success that the International Astronomical Union (IAU) drew up a bold strategic plan to use astronomy as a tool for development around the world, with a particular emphasis on Africa where the need seemed to be greatest. In 2011 the IAU opened their global Office of Astronomy for Development (OAD) to realize that strategy and, in collaboration with DST, placed it in South Africa. The OAD adopted a vision of 'Astronomy for a Better World'.

#### **BIOGRAPHICAL BACKGROUND OF PROF. PATRICIA WHITELOCK**

Prof. Patricia Whitelock is Director of the South African Astronomical Observatory (SAAO) and a Professor in the Astronomy Cosmology and Gravity Centre of the University of Cape Town.

She is on the Council of the CDS in Strasbourg (France) and the steering committee of the International Astronomical Union (IAU) Global Office of Astronomy for Development (OAD). She has in the past been President of IAU Division VII (Galactic System) and Commission 33 (Structure and Dynamics of the Galactic System). Prof. Whitelock chairs the steering committee for the SA National Astrophysics and Space Science Programme (NASSP), she is a fellow of the Royal Society of South Africa, a Member of the Academy of Science of South Africa, a foreign associate of the Royal Astronomical Society (UK) and an honorary member and past President of the South African Institute of Physics.

Her research work has focused on the late stages of stellar evolution and on the use of pulsating stars as extragalactic distance indicators and tracers of Galactic structure.

#### **09:15 – 09:30 'AFRICA'S CONTRIBUTION TO ASTRONOMY: AN INTERDISCIPLINARY APPROACH'**

**PROF. HABIB SY, HOWARD UNIVERSITY, WASHINGTON.**

Africa is the birthplace of humankind. From this extraordinary milestone in human adventure, it follows that *homo sapiens sapiens* may have invented speech and the art of speculating and writing, thus, creating the very foundations of cosmogony, philosophy and astronomy. African astronomy is the first recorded written attempt to develop a corpus of knowledge based on observation, spirituality, mathematics, astrology, architecture and metaphysics.

How did Africans start developing such an astonishing level of expertise in astronomical observation dating back 4000 years BP with research findings and postulates validated in many respects by modern sciences? How do we begin understanding ancient African knowledge systems and reconciling them with contemporary scientific paradigms?

This paper is an attempt to address these two issues using an analytic approach based on historical, anthropological, archaeological and philosophical arguments derived from ancient and modern literature. Finally, this historical survey will discuss the relevance of ancient astronomy to modern astronomy, physics, architecture and philosophy, the bedrock of scientific inquiry.

#### **BIOGRAPHICAL BACKGROUND OF PROF. HABIB SY**

Prof. Habib Sy holds a PhD in Communications Arts and Sciences from Howard University, Washington, D.C. and a M.A. in Mass Communications and Information Sciences from the Sorbonne, Paris II.

He held various senior and executive positions in regional and international organisations prior to teaching in several African and U.S. universities. He is presently coordinator of the Africa Codicology Institute based in Dakar and Timbuktu and Executive Director, Aid Transparency; a regional African NGO specialised in policy research, governance and social justice.

Dr Sy's work is focused on governance and social movements as well as on the history of writing and manuscripts preservation in Africa.

**09:30 – 09:45 'BRING OUR HEADS TOGETHER, SOMETHING WILL HAPPEN'.**

**PROF. ALFRED Z MSEZANE, DEPARTMENT OF PHYSICS, CLARK ATLANTA UNIVERSITY, FELLOW, AMERICAN PHYSICAL SOCIETY**

The title of the talk, referred to as 'Indaba' is the basis of successful scientific collaborations and partnerships. It has been inspired by the recent article in Nature Physics (485, 555, 31 May (2012)) 'Winners all round in telescope bid', quoting Phil Mjwara 'We're really extremely delighted about this'. It is a signature of indigenous African living and conveys the dynamic interactions of individuals, communities and nations and drives the larger African culture as well.

The proposed new telescope will allow South Africa (SA) to expand its current research scope from near zero to the infinite dimension, allowing virtually every individual to participate, consistent with the constitution of SA. In the presentation various research opportunities will be presented focusing mainly on the Social Sciences. With the new telescope SA will again become the world's centre stage as was the case with the discovery of gold in Johannesburg.

The South African mines have voracious appetite for water, energy and human talent. Both the new telescope and the mines will permit access to the complete spectrum of the universe. We will learn, collaborate and enjoy new discoveries. Indaba will be more engaging and meaningful than ever before.

The proposed telescope will certainly provide unlimited opportunities for new discoveries and offer new possibilities for fundamental scientific research and applied as well. We will discuss as examples two conceptually simple novel research breakthroughs from our own research group that were inspired through direct interactions with iThemba Labs. In the first our research group proposes to use atomic gold anions to catalyse methane into valuable industrial products without the emission of carbon dioxide, thereby making gold more precious than itself; the consequences are far-reaching for the environmental remediation. The conversion of water to peroxide using gold (or platinum) nanoparticles is also considered; this is a step toward clean water. The second discusses possible explanation of the matter-anti matter asymmetry in the universe, from a fundamental physics perspective.

#### **BIOGRAPHICAL BACKGROUND OF PROF. ALFRED Z MSEZANE**

Alfred Z Msezane, professor of theoretical physics and founding director of CTSPS at Clark Atlanta University, is an elected fellow of the American Physical Society, the Institute of Physics (London, UK), American Association for the Advancement of Science and the National Society of Black Physicists (USA).

He collaborates extensively nationally/internationally and has published hundreds of research papers in physics journals. With funding from the US National Science Foundation (NSF) he collaborated with Dr. Phil Mjwara and organized the first US-Africa Advanced Studies Institute on Photon Interactions with Atoms and Molecules, held in Durban, 2005 to celebrate Einstein's miraculous years.

In 2008, with funding from the NSF he collaborated with Professor Maaza and organized the first US-Africa Workshop on Nanosciences at iThemba Labs. In 2008, Msezane co-organised the US-Africa Advanced Studies Institute on Environmental and Biological Applications of Lasers, Egypt with Professor Mtingwa (MIT) and Niles; he is a founding member of COMPROMAPH, Benin and has co-edited its Proceedings. He regularly evaluates for the African Laser Centre, Pretoria.

**09:45 – 10:00**     ***'MARIMBA ANI BEGINS HER BOOK, "YURUGU AND AFRICAN-CENTRED CRITIQUE OF EUROPEAN THOUGHT AND BEHAVIOUR"***

**PROF. PITIKA NTULI, ARTIST**

'The African worldview, and the world-views of other people who are not of European origin, all appear to have certain themes in common. The universe to which they relate is sacred in origin, is organic, and is a true cosmos.'

From such beliefs emanate the relationship between humans and heavenly bodies that were part of human life until the Platonic revolution that separated humans from the stars which were then seen as cosmic. Plato led us to Newton and the mechanistic view of life based on dichotomies. I will argue that this mechanistic view of life contributed much to colonial thinking whose strategy was to distort African worldviews and belief systems.

There is a general belief, emanating from this colonial logic, that African people are ignorant of what is happening in the skies and that they do not even have idea or interest in astrological matters. For instance, when western scientists and astrologers heard of discoveries made by the Dogon of Mali regarding Sirius B and their knowledge of its trajectory; they concluded that some spacemen from another galaxy visited Mali and fed these natives with these ideas! Myths and superstitions need to be deconstructed to reveal hidden scientific principles.

My paper will argue that not only did African people take interest in celestial matters but that they planned their lives, rituals and ceremonies according to the movement and position of certain stars and constellations. Since ancient Africa believed in knowledge as a system of mysteries science was hidden in myths and symbols, which to the Western eye were mere superstitions! I will further argue that western prejudices against African knowledge systems prevent them from seeing links between IKS and certain aspects of quantum mechanics!

My paper will demonstrate that cyclicity as an organizing principle in African thought and practice is founded on astronomical principles. From simple beer drinking, dance, worship and architecture demonstrate this cyclicity.

**BIOGRAPHICAL BACKGROUND OF PROF. PITIKA NTULI**

Prof. Pitika Ntuli was educated in South Africa, Swaziland, the US and the UK. He is a poet, writer, sculpture and academic. He taught in several institutions of higher learning in the UK and has lectured worldwide. Since returning to his native land after 32 years in exile he has fulfilled many key positions. He is a former Deputy Vice Chancellor, Student Affairs; Head of Department of Fine Art and Art History; and Adjunct Professor of Sociology and Conflict Resolution.

He has served the country as:

- Chairperson, Ministerial Advisory Panel on African Languages in Higher Education and Training 2012 -
- Chairperson, Ministerial Advisory Committee, Department of Science and Technology on Indigenous Knowledge Systems 2009 -
- Commissioner, Commission on Traditional Leadership Disputes and Claims, 2005 – 2010

His sculptures are exhibited worldwide and he has executed several public monuments in different countries.

**10:00 – 10:15** ***'AFRICA HAS THE NEXT GROWTH POLE: LONG-TERM PROSPECTS FOR THE CONTINENT AND IMPLICATIONS FOR KNOWLEDGE PRODUCTION'***.

**DR GENGEZI MGIDLANA, NEPAD, SPECIAL ADVISOR TO THE CEO.**

This paper will examine the progress made in addressing Africa's development challenges since the introduction of interventions at the turn of this century. I will propose new mechanisms of improving and accelerating the continent's pace of fast tracking development. The paper will develop ideas on how Africa's growth and development process can be enhanced through the evidence based and result oriented system. In this regard, the paper will make specific proposals related to the improvement in the processes of planning, monitoring and evaluation, management of risks and the use of knowledge management mechanisms in order to improve the quality of delivery, ensure that Africa's experiences are recorded and shared and suggest ways in which use of knowledge platforms can promote sustainable partnerships for development with civil society, private sector and beneficiary communities.

#### **BIOGRAPHICAL BACKGROUND OF DR GENGEZI MGIDLANA**

Dr Gengezi Mgidlana is the Deputy Director General in the South Africa Presidency, seconded to the NEPAD Planning and Coordinating Agency (NPCA) as the Special Advisor to the CEO. His current responsibilities are to head the Directorate of Strategy and Knowledge Management that has the functions of planning, monitoring and evaluation, quality assurance and risk management, and knowledge management.

Dr Mgidlana has been of the lead delegation that negotiated the integration of NEPAD into the AU structures and processes. He has been instrumental in the establishment of the NPCA and ensuring that it is appropriately structured to deliver on its mandate.

Dr Mgidlana has vast experience in the legislative sector as the Provincial Secretary to the Gauteng Legislature and having served as the Secretary and later President of the South African Legislature Secretaries Association (SALSA).

10:15 – 10:30 Discussion: Q & A

10:30 - 11:00 TEA



**CELEBRATION OF ASTRONOMY TODAY – LINKING TECHNOLOGY AND SOCIETY.****CHAIR: DR TEMBA MASILELA, DCEO RESEARCH, HSRC****11:00 – 11:15****'COSMOLOGY BETWEEN PAST AND PRESENT: HUMAN FRAGILITY, EVERYDAY LIFE AND ADVANCED TECHNO-SCIENCE'****PROF. ERNST WOLFF, DEPARTMENT OF PHILOSOPHY, UNIVERSITY OF PRETORIA**

If South Africans want to appropriate (and not merely host) an advanced astronomical research project, they will have to contemplate the possible influence that the dissemination of the research findings may have on their outlook on life and the way they live. As philosopher, I would like to engage with some of the terms by which we think about the relation between everyday human life, and the universe – or, to be precise, the relation between everyday life and the universe as it is mediated to us by science, art and religion.

The golden thread, that I shall follow to think about the relation between people and the universe, is 'rhythm': the rhythm of everyday life (or lifestyle), the rhythm of cosmic phenomena and the rhythm of mediation practices (e.g. music in arts and rituals in religion). Accordingly, my argument starts with the description of a general anthropological feature of human life, in all cultures, from ancient times to the present: human beings cultivate the capability to form and maintain a rhythm of life, which is always situated in the field of tension between monotonous repetition (as in tedious work) and complete destabilisation (as in the disrupting experience of being a refugee). The rhythm of life is formed by frequenting people and everyday objects/activities and is stabilised (and improved) through mediations in religion, art and other cultural practices. Traditionally the cultural specific forms by which rhythm is given to human life are often anchored in an observation of the rhythm of the celestial bodies. Hence, the divergent forms of observation of the universe and the subsequent formation of cosmologies and practices by which human life are adjusted to the universe. This adjustment is reflected in cultural goods like rituals, clothing, myths, art, song, dance, calendars, architecture, etc.

However, modern science has had the tendency to undermine the coordination between human and cosmic rhythm: the universe, as mediated by techno-science is simply indifferent to us – one's rhythm of life cannot be attuned to the vast silence of the universe. I shall examine one example (that of Conny Aerts, an astrosystemologist, and an artist, composer Willem Boogman) to show how easily contemporary attempts to soften the strangeness of the indifferent universe can derail.

Consequently, I argue that, against the backdrop of contemporary science, contemporary practices of mediation (e.g. through art) are fundamentally ambiguous: they may be seen to help re-appropriate a universe from which science estranges us, but at the same time, this mediation may entail a disturbing confrontation with the unspeakable indifference of the universe. This conclusion will be shown to have considerable importance for policies regarding the dissemination of research results to the broader public (in TV broadcasts, school syllabuses, etc.). But more important, I argue that the appropriate stance, in the face of the yet unknown revelations by the new techno-scientific instruments, is modesty – not the modesty of citizens or human scientists as humiliated by the powerful institution of natural science, but the modesty of recognising that the enormous unknown confronts us with the fragility, that we share with all human beings.

**BIOGRAPHICAL BACKGROUND OF PROF. ERNST WOLFF**

Prof. Ernst Wolff is professor of philosophy at the University of Pretoria. He works in the fields of social and political philosophy, hermeneutics and the philosophy of technology. The aim of his current research is to develop an integrated theory of the technicity of human action.

Wolff is a frequent participant in local and international conferences and from 2007-2012 he is a fellow of the Institute for Advanced Studies in the Humanities in Essen (Germany). Apart from thirty scientific articles and a handful of chapters in books, Wolff is the author of *De l'éthique à la justice. Langage et politique dans la philosophie de Lévinas* (Dordrecht: Springer, 2007), *Political responsibility for a globalised world. After Levinas' humanism* (Bielefeld: Transcript, 2011) and, as co-editor with Oliver Kozlarek and Jörn Rüsen, *Shaping a Humane World – Civilizations, Axial Times, Modernities, Humanisms* (Bielefeld: Transcript, 2012).

**11:15 – 11:30**     **'EYE ON THE SKY: AFRICAN WRITERS AND THE POPULAR IMAGINATION'**

**PROF. FRANCIS NYAMNJOH, DEPARTMENT OF SOCIAL ANTHROPOLOGY, UNIVERSITY OF CAPE TOWN**

This paper will discuss the convivial relationship that exists between African writing and popular belief systems, drawing on some African writers and the social contexts that inspire their creative imagination. An especial focus would be how African writers represent the interconnections between the supernatural or the world beyond and the events of the world of the here and now, the world of our everyday sensory perceptions. The paper argues that to reduce reality to either worlds, is to miss out on the exciting interconnections and interdependence that makes each of them complete.

**BIOGRAPHICAL BACKGROUND OF PROF. FRANCIS B. NYAMNJOH**

Prof. Francis B. Nyamnjoh holds a BA (1984) and an MA (1985) from the University of Yaounde, Cameroon, and a PhD (1990), from the University of Leicester, UK. He joined the University of Cape Town in August 2009 as Professor of Social Anthropology from the Council for the Development of Social Science Research in Africa (CODESRIA), where he served as Head of Publications from July 2003 to July 2009.

He has taught sociology, anthropology and communication studies at universities in Cameroon and Botswana, and has researched and written extensively on Cameroon and Botswana, where he was awarded the Senior Arts Researcher of the Year for 2003.

He is a 2010 B2 rated NRF Professor and Researcher, and a fellow of the Cameroon Academy of Science since August 2011. His most recent scholarly books include *Negotiating an Anglophone Identity* (Brill, 2003), *Rights and the Politics of Recognition in Africa* (Zed Books, 2004), *Africa's Media, Democracy and the Politics of Belonging* (Zed Books, 2005), *Insiders and Outsiders: Citizenship and Xenophobia in Contemporary Southern Africa* (CODESRIA/ZED Books, 2006), and *Mobile Phones: The New Talking Drums of Everyday Africa* (Langaa/African Studies Centre Leiden, 2009). Dr Nyamnjoh has published widely on globalisation, citizenship, media and the politics of identity in Africa.

He has also published seven ethnographic novels, *Mind Searching* (1991), *The Disillusioned African* (1995), *A Nose for Money* (2006), *Souls Forgotten* (2008), *The Travail of Dieudonné* (2008), *Married but Available* (2009), *Intimate Strangers* (2010), and *Homeless Waters* (2011), a play *The Convert* (2003), a collection of short stories, *Stories from Abakwa* (2007), and a collection of poems, *Predicaments* (2011).

**11:30 – 11:45**     **'LEAVING THE OBSERVATORY: WHY AND HOW ASTRONOMERS SHOULD COUNTER PSEUDOSCIENCE'**

**PROF. GEORGE CLAASSEN, DEPARTMENT OF JOURNALISM, STELLENBOSCH UNIVERSITY**

By propagating belief in astrology which is pure superstition, the media in South Africa and other African countries, as reputable media institutions, align themselves with beliefs that were accepted in the Middle Ages but are not anymore. The media often give exposure to astrologists and other quacks to

make decisions about their lives, e.g. on health, financial matters and their love lives that can seriously affect or even ruin their lives.

The advice given is unscientific and quite often dangerous and the media have a responsibility to educate and enlighten listeners, viewers and readers to make responsible decisions. The media through their continuous propagating of astrological quackery persist in spreading beliefs belonging in the Middle Ages.

The media and journalists should be accountable to support and spread rational thinking, not only in their news bulletins and publications, but also in the way they deal with people (guests they invite on shows and writers they use) making outrageous claims and misleading listeners. And astronomers should not keep quiet about the continuing spreading of pseudoscientific thinking by the media on cosmology. They should leave their observatories and laboratories to engage and inform society.

#### **BIOGRAPHICAL BACKGROUND OF PROF. GEORGE CLAASSEN**

Prof. George Claassen is a member of the South African Science Journalists' Association and was its first president (2008-2009). In 1995, he developed the first and still only course in Science and Technology Journalism at an African university (at Stellenbosch University). He still teaches the course to postgraduate students and also regularly presents courses in science communication to scientists at various universities, e.g. the University of Cape Town and Stellenbosch University. Claassen is the chair of the South African National Editors' Forum's (SANEF) Science Journalism Steering Committee.

He was science editor of *Die Burger* between 2001 and 2007. In 2005 he won the Norwegian government's award for South African environmental journalists to report on the Sustainable Development Programme from the United Nations in New York.

He is the author of a best-selling book on science and pseudoscience, *Faith, Superstition and Other Wishful Thoughts: Perspectives on Discoveries and Irrationalities*, as well as co-editor of *In the Know* and its Afrikaans version, *Goed om te weet* (Tafelberg Publishers, 2010) for which he wrote the chapters on science. In 2007 he was the first winner of South Africa's National Science and Technology Forum's SAASTA Award for Science Communication.

He reports on science for various publications and wrote a regular column on quackery and health matters for Media24's three Afrikaans dailies, *Die Burger*, *Beeld* and *Volksblad*. In 2009 he organised and co-presented a weeklong workshop on climate change for African science journalists attended by 25 science reporters from all over the continent. In 2010, he was the keynote speaker at the United Nation's conference on Climate Change Reporting in Nairobi. In 2011 he organised and co-presented the first Science meets the Media Workshop, sponsored by the Department of Science and Technology and SAASTA, at Stellenbosch University, attended by nearly a hundred South African scientists and journalists

**11:45 – 12:00**    **'ORIENTALISM AND CULTURAL ALIENATION'.**

**DR HESTER DU PLESSIS, HEAD: SCIENCE COMMUNICATION, RESEARCH USE AND IMPACT ASSESSMENT (RIA), HUMAN SCIENCES RESEARCH COUNCIL (HSRC).**

Through centuries of trade and human migrations, the Arab cultures permeated the traditions and customs of societies living in the African Sub-Sahara. These centuries of contact initiated the transfer of knowledge, promoted cross-cultural intellectual growth - with some of its origins in Islamic religious practices and systems of education - and established a mixing of worldviews. The ideas of Islamic scholars became indigenized within the African cultures and contributed to the development of knowledge originally embedded within African systems of knowledge.

When the early colonisers from Europe arrived in Africa they encountered these mutual influences and spontaneously perceived the African cultures to be ideologically hybridized, different from the principles of the west and devoid of scientific knowledge. This difference between east and west progressively endorsed a perception of Africa and the east as being 'exotic' and representative of the 'other'. Africa, as a result, was depicted by the early Orientalists in paintings and in travel chronicles as inhabitants of the Orient and thereby created a powerful semiotic lexicon of images.

This paper explores some of the facets of the origins of Orientalism and its influences on perceptions about Africa. The earliest known Islamic manuscript reporting the study of astronomy, the *Zij al-Sindhind* by *al-Khwarizmi* in 830, has its origin from Indian and Persian texts (700 and 825). The early observatories in the Islamic world were built as large scale instruments to observe the sun, moon and planets. Evidence of such knowledge exists in Egypt. With the project on Timbuktu, new information about ancient astronomical studies in Africa will come to light. The knowledge revealed by the Timbuktu Library manuscripts could easily serve the purpose of further institutionalising the effect of Orientalism on east-west perceptions of 'the other'. Alternatively, the acceptance of the epistemology of ancient knowledge with its roots in African Cosmology could provide the resource for capturing the spirit of Dani Nabudere's (2011, 2012) proposed Afrikology.

#### **BIOGRAPHICAL BACKGROUND OF DR HESTER DU PLESSIS**

Dr Hester du Plessis (DLitt et Phil in Philosophy), has a Master's in Fine and Applied Art (Tshwane University of Technology) a PhD in Philosophy (UNISA) and is a senior research specialist and Head of Science Communication in the Research Use and Impact Assessment (RIA) unit at the HSRC.

She was an Art Historian/lecturer at the Arts Faculty at Tshwane University of Technology, a senior researcher at the Faculty of Art, Design and Architecture and associate senior researcher at the Sustainable energy Technology and Research (SeTAR) Centre, Faculty of Science at the University of Johannesburg. She was a Research Chair in Design Education and Innovation at the National Institute of Design (NID) in Ahmedabad, Gujarat, India during 2008/9.

Her research in Public Understanding of Science (PUS) is done in collaboration with the Science Communication through Multi-media (SCM) unit at the National Institute for Science Communication and Information resources (NISCAIR), CSIR, New Delhi, India. She works on a number of science communication research projects such as the Philosophers of Science in Africa and India project that forms a part of the HSRC Africa Knowledge Producers Series and an international science communication project: Epistemological review of a science communication model with the focus on the development of pro-poor policy.

She is a fellow at the Mapungubwe Institute for Strategic Reflection (MISTRA), and a team member of the project: *The concept and application of transdisciplinarity in intellectual discourse and research*. She was co-editor of a book: Raza, G & du Plessis H 2002, *Science, craft and knowledge*. Pretoria: Proteaboeke. Her most recent chapter contributions were in: Bucchi, M. and Trench, B. 2008. *Handbook of public communication of science and technology*. London: Routledge. Raza, G & Fujun, R. & Khan, H. & Wei, H. (eds) 2011. *Constructing culture of science: communication of science in India and China*. New Delhi: NISCAIR. Schiele, B. & Claessens, M & Shunke, S. (eds). 2012. *Science communication in the world: practices, theories and trends*. London: Springer.

12:00 – 12:30 Discussion: Q & A

12:30 - 13:30 Lunch

**HUMANISING THE ROLE OF ASTRONOMY/COSMOLOGY****CHAIR: PROF. BERNARD SCHIELE, UNIVERSITY OF UQAM, MONTREAL, CANADA.****13:30 – 13:45****'GONE TO THE MOON': INDIGENOUS KNOWLEDGE, ASTRONOMY, AND METAPHORS FOR GIRLS' PUBERTY IN KWAZULU-NATAL CONTEXTS'****PROF. RELEBOHILE MOLETSANE, JL DUBE CHAIR IN RURAL EDUCATION IN THE FACULTY OF EDUCATION, THE UNIVERSITY OF KWAZULU-NATAL**

Communities around the world view the onset of puberty generally, and menarche (onset of menstruation) in particular, as a critical moment in a girl's transition to adulthood. Alternatively hidden, celebrated or lamented the moment of the first bleeding brings significant physical, physiological changes, as well as social and cultural pressures for girls (Sommer, 2011). In other words, the onset of menstruation signals an end to girlhood (Kirk & Sommer, 2006). In response, whether it is to celebrate or lament menarche, families and communities have, over the years, developed local narratives and discourses around menstruation. Such responses tend to construct menarche as significant amid the biological changes of puberty due to its perceived link to fertility, sexual readiness and also the beliefs about the power of menstrual blood and its links to cosmology and the (super-) natural environment. This presentation will present preliminary findings from a study that assessed the impact of a water and sanitation pilot intervention on schooling and the strategies girls' use to manage puberty and menstruation in schools. In particular, the paper will examine girls' understandings of menarche and the indigenous knowledge as reflected in local beliefs, narratives, traditions, myths and taboos associated with menstruation in families, communities and selected schools in KwaZulu-Natal.

**BIOGRAPHIC BACKGROUND OF PROF. RELEBOHILE MOLETSANE**

Prof. Relebohile Moletsane is Professor and JL Dube Chair in Rural Education in the Faculty of Education, the University of KwaZulu-Natal. She has extensive experience in teaching and research in the areas of curriculum studies and gender and education, HIV and AIDS Education and girlhood studies in Southern African contexts.

Her methodological interests include the use of participatory visual methodologies in doing research and development work with marginalized groups. She is PI on a project which uses digital story-telling with teachers.

Moletsane has published several articles and book chapters on using digital technology and digital storytelling in rural communities, including celphlms, short videos, and photo- documentaries and photo narratives.

She is also the co-author (with Claudia Mitchell, Ann Smith and Linda Chisholm) of the book: *Methodologies for Mapping a Southern African Girlhood in Age of Aids*. Rotterdam/New York/Taipei: Sense Publishers, a co-editor (with Kathleen Pithouse and Claudia Mitchell) of the 2009 book: *Making Connections: Self-Study & Social Action*. New York: Peter Lang; and a co-editor (with Claudia Mitchell and Ann Smith) of a 2012 book, *Was it Something I Wore? Dress, Identity, and Materiality*. Cape Town: HSRC Press.

**13:45 – 14:00****'RECONNECTING IN THE QUEST FOR COSMIC UNIFICATION OR: WHITHER ASTRONOMY'S RETURN IN AFRICA'****DR LEONARD MARTIN, MAPUNGBWE INSTITUTE FOR STRATEGIC REFLECTION (MISTRA)**

*'Surely, this new journey will speak of a world made exciting by the rapid progression away from everything that is weary, stale, flat and unprofitable in human knowledge, the lifting of the dark and*

*menacing shadow of ignorance and prejudice about the origin of the universe, that circumscribe our very ability to eat, live and think*'. (Thabo Mbeki, 10<sup>th</sup> November 2005)

As the title of the Conference in September suggests 'the re-emergence...' simultaneously implies 'a disappearance' or absence. In the reaching out to the heavens and to the stars, starting with the KHOI-KHOI peoples of Africa, most ancient of humans, humankind announced its ambition to remain connected to all that was elevated in civilisation. This was a moment of birth of Astronomy and of civilisation. It will be the intention and focus of this paper to reconnect and to critically historicise the African 'disconnect' and return of the profound humanising journey and purpose of astronomy. The contribution will in this quest pose the question whether this re-emergence is simultaneously also the definitive end of the '*Othering*' of the African continent in this global leap in the deeper knowledge of our universe? This appears to be the 21<sup>st</sup> century emerging paradigm in the cosmic unification of our species.

#### **BIOGRAPHICAL BACKGROUND OF DR LEONARD MARTIN**

Dr Leonard Martin was born in Johannesburg, and matriculated at Coronationville High School. Due to his political activities in opposing the Apartheid Government, he was put on trial in 1970's and went into exile. He finally found refuge in Denmark, Scandinavia.

There he embarked on a range of academic studies. He completed his degrees in Political Science and Sociology as well as completed Master's degree and Doctorate in Political History of Ideas and Cultural Studies at the University of Aarhus, Denmark. He also did a joint degree in Law and Sociology at the University of Warwick, England.

Dr Martin was awarded a Senior Rhodes, South Africa in 1994. During this period he was also recruited as Deputy Director to develop the political analysis department of the IEC for the first democratic elections.

In the year 2000 he became the acting Head of Political Science and International Relations at the University of North West. He was later recruited into the Council of Higher Education in the Capacity of National Project Manager, Audit and Evaluation Directorate. Dr Martin has published various books and articles and has served as key note speaker and facilitator under a variety of topics such as ethics, BEE, anti-racism, migration, etc.

He also holds diplomas in leadership and project coordination. Amongst others he has been the editor of a diasporian magazine for African intellectuals in Scandinavia. Most recently he served as the Head of the Stakeholder Division of the Financial and Fiscal Commission of South Africa.

Dr Martin was appointed as Content Manager of the Mapungubwe Institute in May 2010.

#### **14:00 – 14:15     '*CREATING A CLIMATE CONDUCIVE TO FULFILLING SOUTH AFRICA'S SCIENCE COMMUNICATION IMPERATIVES*' MS NICOLE BREEN, RESEARCH USE AND IMPACT ASSESSMENT INTERN, HUMAN SCIENCES RESEARCH COUNCIL**

South Africa's post-constitutional dispensation promotes a culture of transparency and accountability. Among the rights and responsibilities conferred by these principles is the promotion of science communication. Scientific knowledge is an integral part of progress, and communication thereof should thus be propelled to the forefront of the policy agenda.

The South African legal landscape provides the right to access to information and a concomitant responsibility on the part of duty-bearers to publish and disseminate this information to multi-level stakeholders. It also implicitly provides an imperative that policy be made on the basis of the best

possible evidence. Despite this seemingly clear-cut mandate, much research is lost in an ostensibly unbridgeable chasm between those in possession of knowledge regarding scientific developments and those who are entitled to the information and who often urgently require it.

This paper aims to explore this deficit through examination of the relevant legislative framework, comparison of trends in South Africa with the other BRICS states and through examination of a topical case study (specifically the Square Kilometre Array). As emerging players in the international arena the BRICS states are typical representations of countries struggling to reconcile the need for publication and dissemination of information with the associated challenges of doing so.

In South Africa, the legal framework is more progressive than certain of the other states in the BRICS classification. An advanced paradigm, however means nothing if policymakers, legislators and other interested parties do not or cannot follow an evidence-based approach. South Africa's successful bid to host the Square Kilometre Array (a groundbreaking radio telescope) is an example of how an attempt has been made to bring cutting edge scientific development to the fore. It is submitted that this analysis could serve as a starting point for the development of a multi-faceted science communication model; suggesting better practices, better implementation of the existing framework and ultimately systemic change in science communication as a whole.

#### **BIOGRAPHICAL BACKGROUND OF NICOLE BREEN**

Nicole Breen is a Master's intern in Science Communication within the Research Use and Impact Assessment group at the HSRC. Nicole was previously employed by Save the Children Sweden, The Centre for Child Law and Lawyers for Human Rights. She is currently studying at University of Pretoria in LLM Human Rights

#### **14:45 – 15:00 'THE SKA IS THE LIMIT? MAKING POLITICAL MEMORIES AND SCIENTIFIC DISCOVERIES'**

**PROF. MIKE MASEMOLA, DEPARTMENT OF ENGLISH STUDIES, UNIVERSITY OF SOUTH AFRICA**

As the political North animatedly celebrates the Higgs-Boson breakthrough on the proton particle that gives mass to matter in Geneva, the political South has much more to anticipate in the successful hosting of the Square Kilometre Array in the Karoo and countries that straddle the SADEC Region - ensuring not only sensitive astronomical discoveries but also giving content to the sensible maximization of political gains in the form of deepened regional integration. It is noteworthy that while the interferometric radio array has a total collecting area of one square kilometre, as Burke(2000) elucidates, referring to the total collecting area and not to the physical extent of the array across collaborating Southern African countries across thousands of kilometres, the collaborative spinoffs will go beyond discovery in the realm of astronomy. In essence, this paper posits a hypothesis that the scientific spinoffs will not exclusively be limited to skills and technology transfer but will extend to the beneficitation of the African Union-inspired Regional Integration, with SKA as the pivotal scientific hub of the integrated Regional Infrastructure Development Plan.

#### **BIOGRAPHICAL BACKGROUND OF PROF. MIKE MASEMOLA**

Prof. Masebola joined the Department of English Studies in UNISA in mid-2011, having previously held the position of Chair of Department of English at North-West University (Mafikeng Campus) for a number of years. He holds a PhD on Transcultural Memory from the University of Sheffield in England, mobilising a Deleuzian critique of immanence in the analysis of transnational cultural expression in autobiography. In the same vein, his most recent publications are on Wordliness, published in the SOAS-based *Journal of African Cultural Studies* (Vol 24, 2012); on T/races of terrorism in *Social Dynamics* (Vol 37, 2011); on the assemblage of the transnational culture of Tinseltown and Sophiatown in *Journal of Literary Studies* (Vol 27, 2011), on the spillage between Lack, Law and Desire also in *Journal of Literary Studies* (Vol 26, 2010),

over and above chapters in peer-reviewed books. Interdisciplinary interests cover the social implications of biometric technologies and nanotechnology in the profiled targets of the anti-terrorism drive coupled with immigration controls.

**15:00 – 15:15**     ***THE OPPORTUNITIES FALLING FROM THE SKIES FOR ICT IN SOUTH AFRICA: HOW DO SOCIAL SCIENTISTS BENEFIT?***  
**DR HAPPY SITHOLE, CENTRE FOR HIGH PERFORMANCE COMPUTING, CSIR**

The bid for the Square Kilometer Array (SKA) has finally come to an end, causing everyone to look at the skies for what will be falling next. The main questions from every sphere of the global society are what are the benefits of such a massive project? In the Information and communication technology space, the questions regarding processing of massive amount of data coming from the telescopes is the key focus, at least from the point of the geeks and hard-core scientists. What does a man on the street benefit? This paper looks at the opportunities and challenges brought by SKA and how the ICT community on the peripherals of astronomy could benefit.

15:15 – 15:30     Discussion: Q & A

**15:30 – 16:00**     **SESSION 7**

**Closure and the way ahead**

**Chair: Dr Temba Masilela, DCEO, HSRC**

**TEMBA SIPHO B. MASILELA**, is currently the Deputy CEO Research of the HSRC.

Temba holds PhD and MA degrees in development support communication at the University of Iowa, and a BA degree in economics and politics from the University of Nairobi. His wide-ranging research interests include social policy, public management reform, social innovation, media and democracy, health communication, and stakeholder engagement.

Before joining the HSRC in July 2006, he worked for a number of years as a special adviser to the minister of social development in the government of South Africa. He has also worked in the areas of corporate citizenship and reputation management, in both commercial (Telkom SA Ltd) and academic settings (Centre for Corporate Citizenship, University of South Africa).

He started his working life as a journalist in Kenya and taught health communication, research methods, media policy, and editing for a number of years at the School of Journalism at Rhodes University.

He is currently an associate fellow of the Department of Social Policy and Social Work at the University of Oxford, UK.

16:00 - 16:30     TEA and end of conference

16:30             Departure





science & technology

Department: Science and Technology  
REPUBLIC OF SOUTH AFRICA



arts and culture

Department: Arts and Culture  
REPUBLIC OF SOUTH AFRICA



National Research Foundation



CODESRIA



SAASTA

South African Agency for Science and Technology Advancement



Africa Institute of South Africa  
Development Through Knowledge

Freedom PARK  
a heritage destination

MAPUNGUBWE  
INSTITUTE FOR STRATEGIC REFLECTION (MISTRA)

ASSAf  
ACADEMY OF SCIENCE OF SOUTH AFRICA

HSRC  
Human Sciences Research Council