African Light Source Workshop
November 19, 2015
ESRF

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Triangle Science, Education &
Economic Development, LLC
Hillsborough, NC, USA
ALC Representative to the Americas

2003 – 2015
12 years of shining the light!

What is the ALC?

- The ALC is a **distributed center of excellence** for the African continent.
- The ALC is an **open non-exclusive partnership** to stimulate innovation, research and technology development **in lasers, optics, and photonics, and the application thereof**, in Africa.
- The ALC **seeks local and global partnerships** to achieve its aims.
- ALC is an **African Union-NEPAD Flagship,** as captured in the 2003 Consolidated Plan of Action for Science and Technology

  (NEPAD= New Partnership for Africa's Development)

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2001 Workshop in Pretoria (Convener: Dr. Philemon Mjwara, NLC)

In attendance were laser experts, government officials, and other interested partners from Africa, Europe and the United States. – from the attendees, two task teams were formed

Task Team 1: Convened by *Paul Buah-Bassuah* of the Laser and Fibre Optics Centre (LAFOC) at the University of Cape Coast, Ghana, and *Sekazi Mtingwa* of MIT and North Carolina A&T State University. This team led the writing of the *ALC Strategy and Business Plan*.

Task Team 2: Convened by *Giovanni Hearne* of the University of the Witwatersrand (currently at the University of Johannesburg) *and Hubertus von Bergmann* of the Laser Research Institute at the University of Stellenbosch. This team performed exhaustive equipment audits of laser research and training facilities in a number of African countries, and even the island of Réunion.

Based upon the audits' findings, Task Team 1 produced the *Strategy and Business Plan* with important inputs from a number of people, mostly the following:

- ***Senegal* - *Amadou Wagué* (Université Cheikh Anta Diop de Dakar and President of the ICTP-sponsored African Laser Atomic Molecular and Optical Sciences Network, more widely known as the LAM Network)**
- **Tunisia – *Zohra Ben Lakhdar, Mourad Zghal (Univertisty of Tunis El Manar)***
- **Egypt - *Yehia Badr* (Director of NILES, the National Institute of Laser Enhanced Sciences, at Cairo University)**
- **South Africa - *Philemon Mjwara, Darrell Comins, Hardus Greyling, Danie de Lange, Malik Maaza , Max Michaelis, Narendra Viranna***
- **Italy - *Gallieno Denardo* (Head of the Office of External Activities for ICTP)**
- **France - *Pierre Chavel* (General Secretary of the International Commission for Optics)**
- **Sweden - *Sune Svanberg* (Lund University, Sweden)**

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Official launch of ALC was on **Nov. 6, 2003**, in Johannesburg, during the **2003 launch of the African Ministerial Council on S&T (AMCOST)**

ALC founders attending the launch ceremony in Johannesburg

ALC founders attending a business meeting in Pretoria, November 2003

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Laser show during the NEPAD launch ceremony of the ALC Johannesburg,

November 2003

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ALC Principal Objectives

- To promote **research and training** in lasers, optics and photonics
- To promote collaboration among laser researchers:
  - **Among African institutions**
  - **Between African institutions and their international counterparts**
  - **To enhance the efforts of any other laser-driven initiatives in Africa**
- To **reverse the brain drain** of researchers from the African continent.
- To facilitate the availability of:
  - **financial resources**
  - **technical assistance**
  - **equipment loans, exchanges and transfers**
- To **improve the quality of life** of all African peoples

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Countries with ALC member institutions

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Main Programs

Research

- Facilitates collaborations among institutions across Africa – **Established**

Education

- Includes Lectureships, Post-docs, Fellowship, Doctoral Sandwich Programmes *Conferences, Workshops & Topical Schools Programme*, *Internship Programmes*, *Technician training* – **Established**

Organizational Development – **Established**

- Currently fully supported by DST in RSA

Equipment & Research Infrastructure – **Developing**

- Strategy for continental Laser equipment
- Technical assistance to laser laboratories, equipment loans & donations, purchase of continental research equipment
- Addressing IP issues

Technology Transfer Program – **Planning**

- Taking innovative ideas and products to market

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Finances

2014/15 DST Budget allocation – R4.9m VAT Incl

Coast Allocation	Funding distribution
Research collaborations	40%
Education and Training	35%
Program development & Administration	25%

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UNESCO-TWAS Co-funding

- UNESCO Research Chair @ Unisa
- Co-hosting of ALC Training – Namibia, Morocco
- Prize sponsorships
- TWAS-UNESCO –ALC Associateship Agreement:
  - Each funded ALC research collaboration may undertake up to two visits for 2 to 3 months over a 3-year period.
  - TWAS will provide airfare and a stipend of US$300.00 per month for incidental local expenses.

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Current Nodes of the ALC

Biophotonics,
Spectroscopy
Math optics,
Laser dev

Facility	City and Country	Field of Specialisation
National Laser Centre	Pretoria, South Africa	Manufacturing, Machining, and Materials Processing
University of Cheikh Anta Diop	Dakar, Senegal	Atomic and Molecular Physics and Laser Spectroscopy and Processing
Laser and Fibre Optics Centre (LAFOC)	Cape Coast, Ghana	Agricultural and Environmental Science
National Institute of Laser Enhanced Science	Cairo, Egypt	Medical and Biological Applications of Lasers
Tunis el Manar University	Tunis, Tunisia	Plant and Environmental Science and Molecular Spectroscopy
Advanced Technologies Development Centre (CDTA)	Algiers, Algeria	Laser Spectroscopy and Surface Studies

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ALC Board of Directors

- Dr Ndumiso Cingo (Chairperson) - **South Africa**
- Dr Mourad Zhgal – **Tunisia**
- Prof Zohra Benlakhdar – **Tunisia** (not in pic)
- Prof Ahmadou Wague (LAM Network)
- Dr Jean Marie Ndjaka - **Cameroon**
- Dr Adeniyi Y. Fasasi– **Nigeria**
- Professor Hubertus von Bergman **– South Africa**
- Dr Tom Otiti **- Uganda**
- Dr EL-Hachemi Amara – **Algeria**
- Dr Mantoa Sekota **- Lesotho**
- Professor Paul Buah-Bassuah (Vice-Chair) – **Ghana**
- Professor Shyam Singh - **Namibia**
- Professor Sekazi Mtingwa –**United States of America** (not in pic)
- Dr James Uhomoibhi – **UK** (not in pic)

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2014 Research Projects

Proposal number	Applicant Detail	Collaborator	Project Title
1	Van Dyk, EE (South Africa)	Okullo Willly (Ugandan)	Large area laser beam induced current characterization of photovoltaic modules.
2	Van de Venter, M (South Africa)	Marouf, Abderrazak, (Algeria)	Identification of novel phyto-therapies against neurodegenerative diseases using flow cytometry..
3	Comins, D (South Africa)	Saoula N (Algeria) Wamwangi D (Kenya)	Growth of thin supported films for surface Brillouin scattering investigations
4	Van de Venter, M (South Africa)	Sowemimo, A (Nigeria)	Anticancer and anti-inflammatory activities of medicinal plant extracts: elucidation of molecular mechanism of action using laser based technologies
5	Sekkat Z (Morroco)	Maaza, M (South Africa)	Tissue Engineering/Regenerative Medicine By Surface Nanostructuring/Patterning Via Ultrafast Pulsed Laser Based Techniques and Single Molecule Photonic Diagnostics.
6	Leitch A (South Africa)	Waswa D. W. (Kenya)	Modelling and experimental investigation of advanced PMD, nonlinear effects and modulation format on the performance of next generation optical fibre network.
7	Sivakumar V (South Africa)	Traiche M (Algeria)	LIDAR developments for atmosphere studies in South Africa and Algeria (LISAA)
8	Olubambi, Peter (South Africa)	Hamida, Essom (Algeria) Omoyinbo, Joseph (Nigeria) Pityana, Sisa (South Africa) Andrews, Anthony (Ghana)	Tribocorrosion and structural transformation studies on titanium-based composite coatings
9	Van de Venter, Maryna (South Africa)	Rashed, Khaled (Egypt)	Anti-diabetic properties of African Medicinal Plants: Exploring molecular mechanisms using flow cytometry.
10	Guerbous L (Algeria)	Maaza, M (South Africa)	Novel pixelized nano-phosphors for medical CT scans and airport security applications
11	Pityana S (South Africa)	Amara E. H. (Algeria)	Laser based additive manufacturing

Yellow = New applications No color = Continuations

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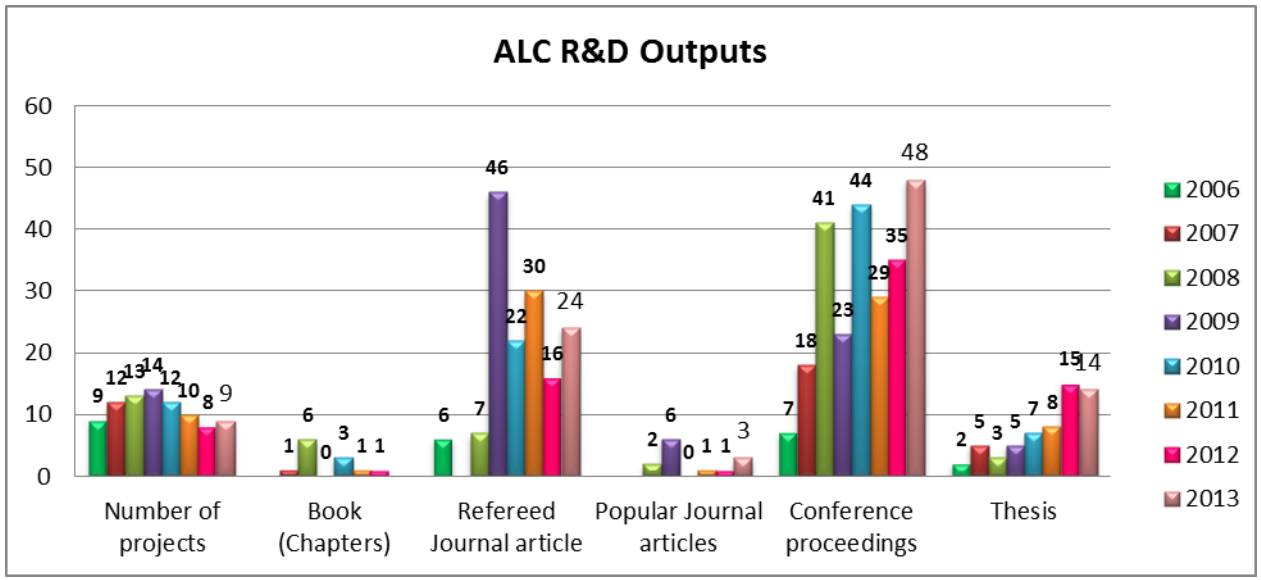
ALC R&D Outputs



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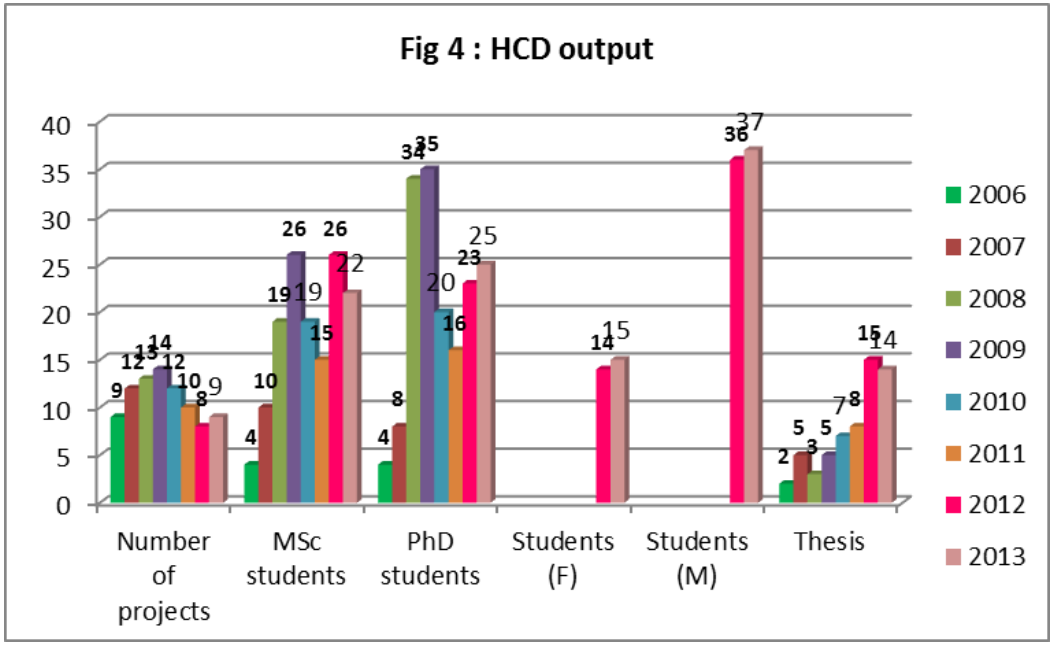
ALC HCD Outputs



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Training Events: 2013

	ALC Training _2013	
Event	**Venue**	**Number of delegates**
First African Summer School on Optics and Applications to Sustainable Development	Tunis, Tunisia, 31/08 - 08/Sept / 2013	55
9th International Workshop on Adaptive Optics for Industry and Medicine	Stellenbosch, South Africa; 02-06/Sept/2013	80
LASERS IN TEACHING AND RESEARCH: THEORY AND APPLICATIONS	University of Eldoret, Kenya, 08-14 Sept 2013	40
6th ALC Student Workshop	Stellenbosch, South Africa; 21-24 Nov 2013	**40**
5th South African Conference on Photonic Materials	Kariega, RSA, 29 April - 03 May, 2013	45
Quantum Information Processing, Communication and Control	Pumula Hotel, KZN, RSA, 25-30 Nov 2013	55
Spectrophotometer Development Workshop	University of PTA, RSA, 18-19, Nov, 2013	8

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5th Annual ALC Student Workshop Namibia 2012

1st African Summer School on Optics and Applications For Sustainable Development Tunisia 2013

ALC Lasers in Teaching and Research Workshop Kenya 2013

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ALC Outputs Total since 2006

Output	Quantity	Comments
Projects supported	**87**	A total of 87 research collaborations between a South African team and other African research teams elsewhere on the African continent have been supported up to. This represents 87 grants.
Publications in refereed journals	**151**	Annual Report for period 2006 – 2013
Popular journal articles	**13**	Annual Report for period 2006 - 2013
Publications in conference proceedings	**210**	Annual Report for period 2006 - 2013
Chapters in books	**12**	Annual Report for period 2006 - 2013
Theses completed	**59**	Annual Report for period 2006 - 2013
Masters scholarships awarded	**38**	This represents total the number of scholarship grants that were awarded within the period 2007-2013.
PhD scholarships awarded	**78**	This represents the total number of scholarship grants that were awarded within the period 2007-2013.
Training events (workshops/conferences/symposia, short courses) supported	**33**	2005-2013
Number of students trained at workshops, symposia and short courses	**1249**	Number of beneficiaries to ALC training since inception to 2013
Masters Students supported	**141**	This represents the total number of MSc students working within the supported collaboration projects.
PhD Students supported	**165**	This represents the total number of PhD students working within the supported collaboration projects.

ALC Co-Funding or Support Leveraged

- **Algeria - R100 K in 2009**
- **Government of Namibia** – Co-sponsoring of ALC Annual Student Workshop 2012
- **Government of Morocco and Algeria** – Co-sponsoring of ALC Annual Student Workshop 2014, and ALC 10th Anniversary Celebrations
- **Bilateral cooperation agreements with 7 countries** where "Laser Science and Technology" is specifically mentioned as focus – South Africa, Kenya, Algeria, Egypt, Namibia, Zambia, Senegal
- **UNESCO-TWAS**
  - 18 Exchange Fellowships, 2 each for the 9 Research Projects currently sponsored by the ALC
  - University of the Free State Physics Department – 2 Exchange Fellowships
- **Wirsam Scientific and A&J Scientific** sponsorship of awards at ALC Student Workshops

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2015 International Year of Light initiative

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Thank You