

# Photonics in South Africa

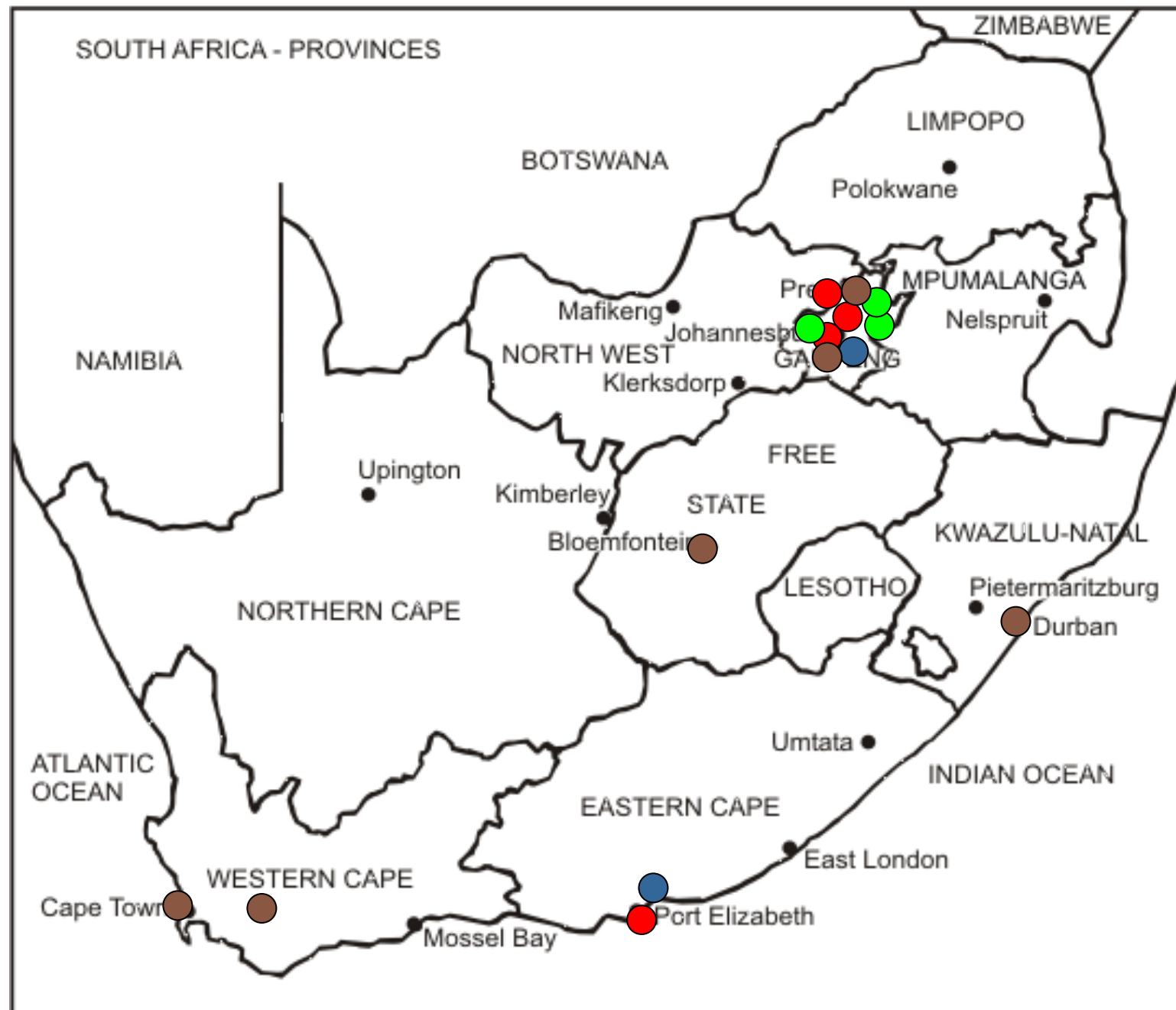
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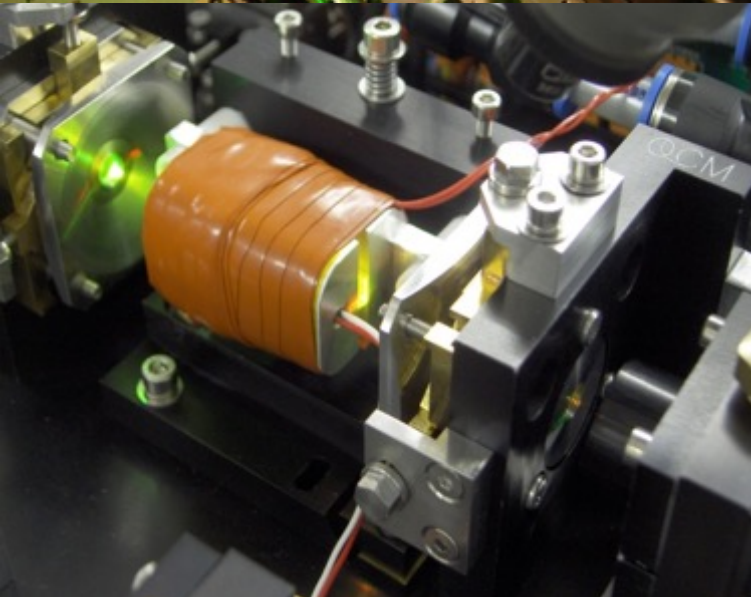
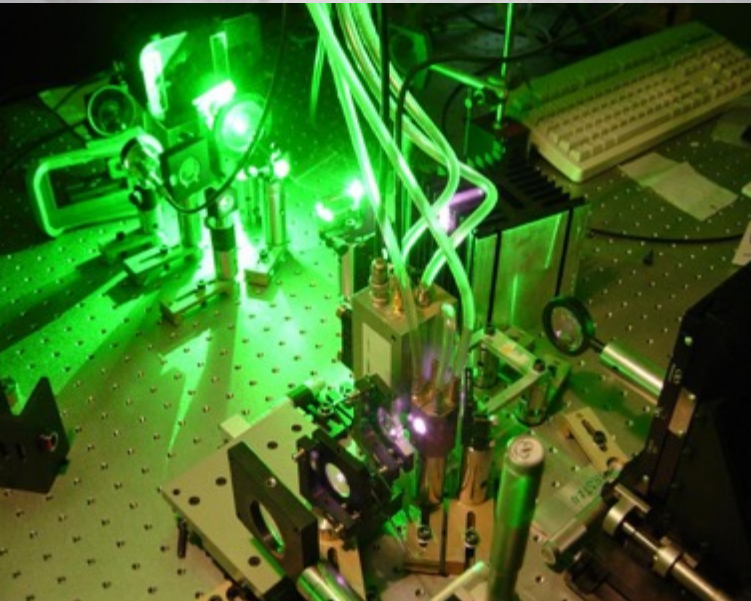
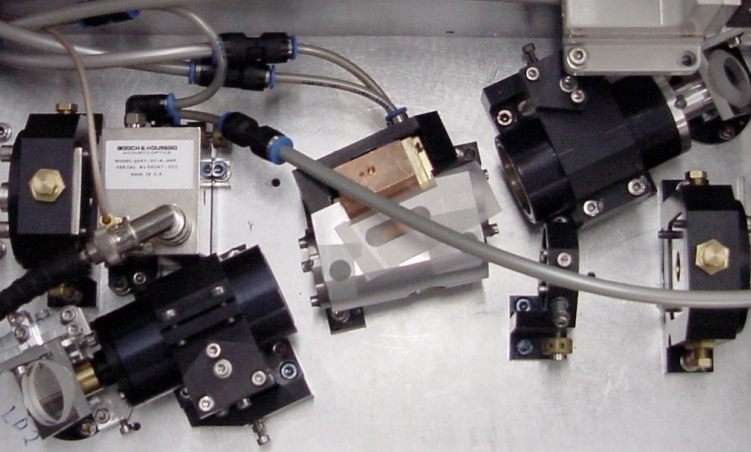
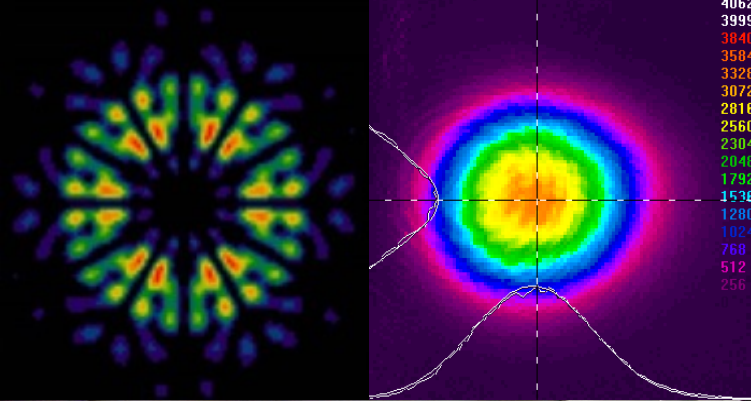




- Optical properties of substrates and thin films at **NMMU, CSIR, UP** and **WITS**.
- Laser Sources at **CSIR, DENEL** and **SDI**.
- Fibre Optics/Fibre Bragg Gratings and their applications at **UJ** and **NMMU**.
- New technologies, such as fs science (**US**), EUV generation (**UKZN**), Quantum Cryptography (**UKZN**), Nanotechnology (**CSIR, UOFS, iThemba**) and Biophotonics (**CSIR, UJ**).

Emerging laser research

Status ~2010



# The aim is to fill the “photonics void”

- **Only** ~1% of SET PhD students are studying Photonics;
- **Only** ~1% of SA’s SET journal outputs are in Photonics;
- **Only** ~0.1% of SA’s GDP due to Photonics.



science & technology

Department:  
Science and Technology  
REPUBLIC OF SOUTH AFRICA

**Vision:** To move South Africa towards a knowledge based economy.



**Vision:** To position South Africa as a globally competitive player in Photonics for the benefit of South African society.

# African Laser Centre

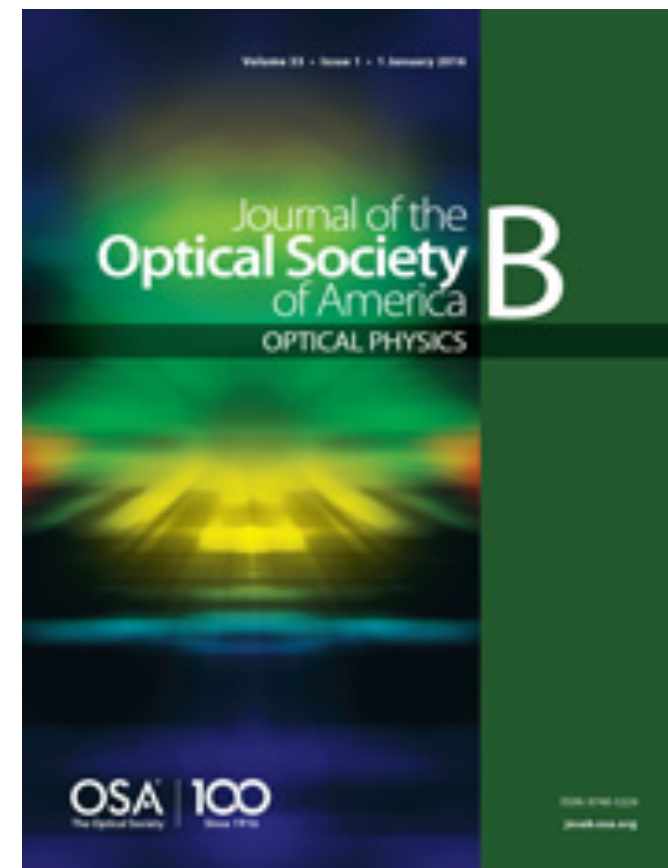
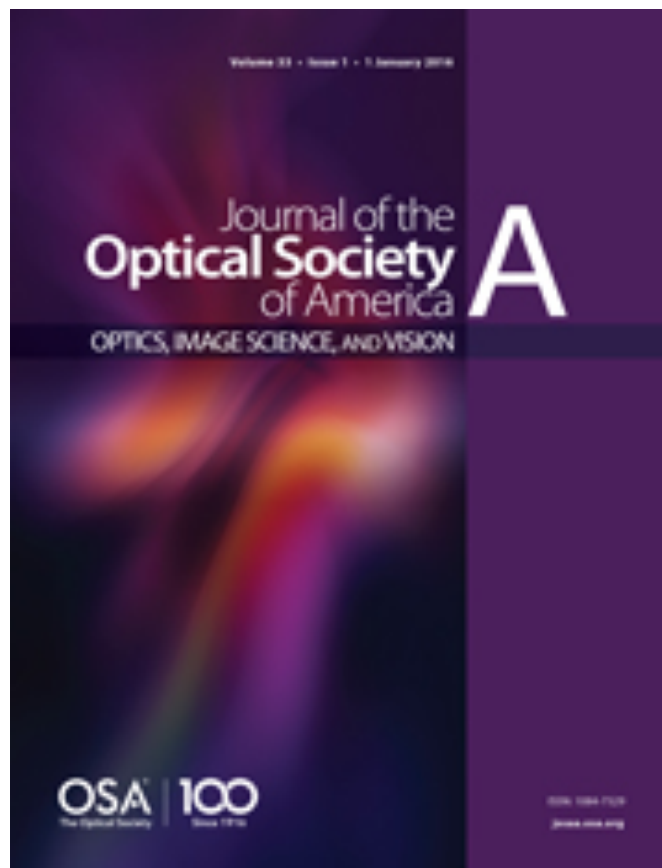
Taking photonics to the continent





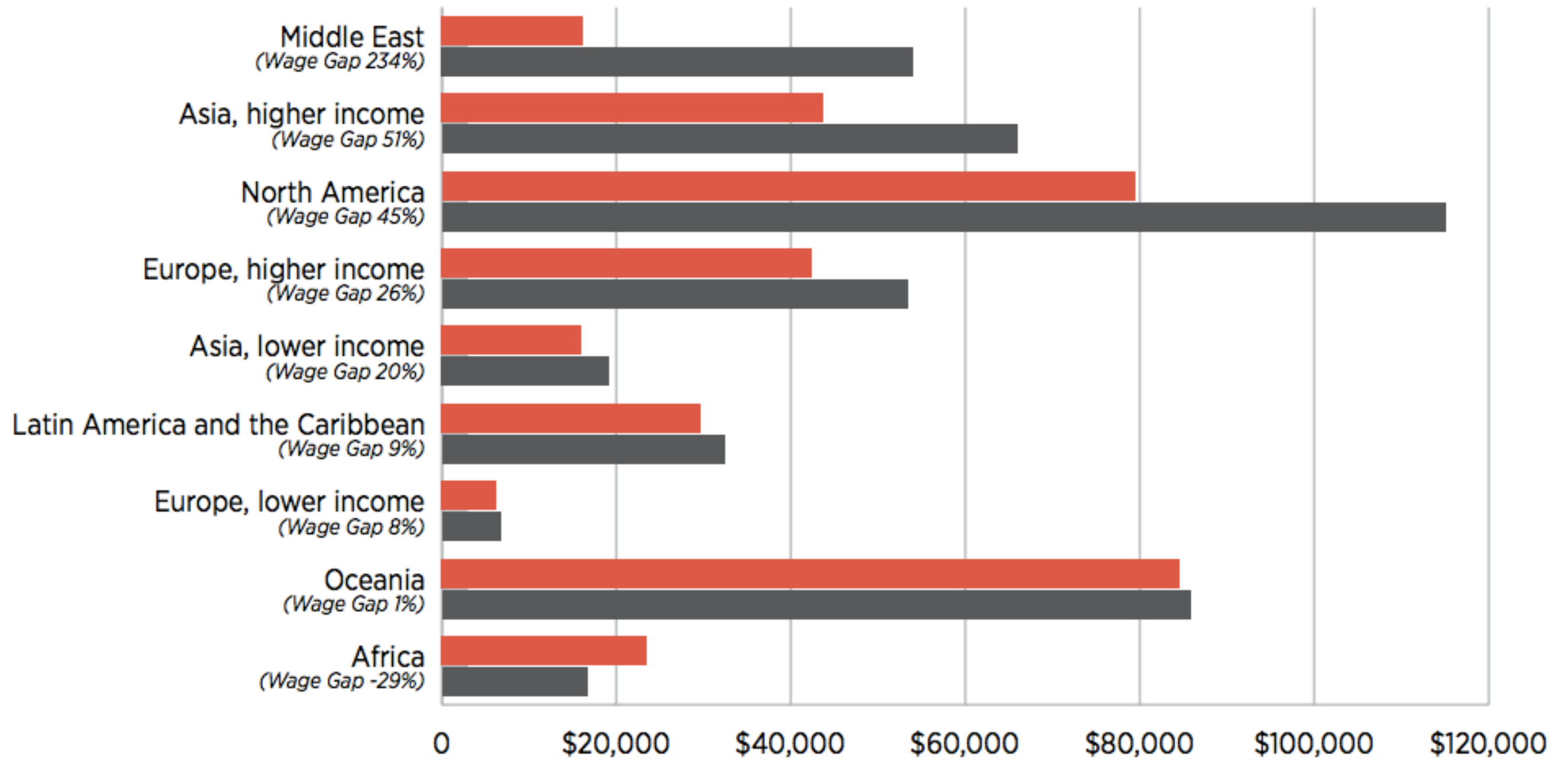
# Optics in Africa (Nov issue)

**Guest editors:** Andrew Forbes (South Africa), Rim Cherif (Tunisia), Angela Dudley (South Africa) and Alain Dikande (Cameroon)



Work EE or more

## MEDIAN SALARY BY GENDER AND REGION



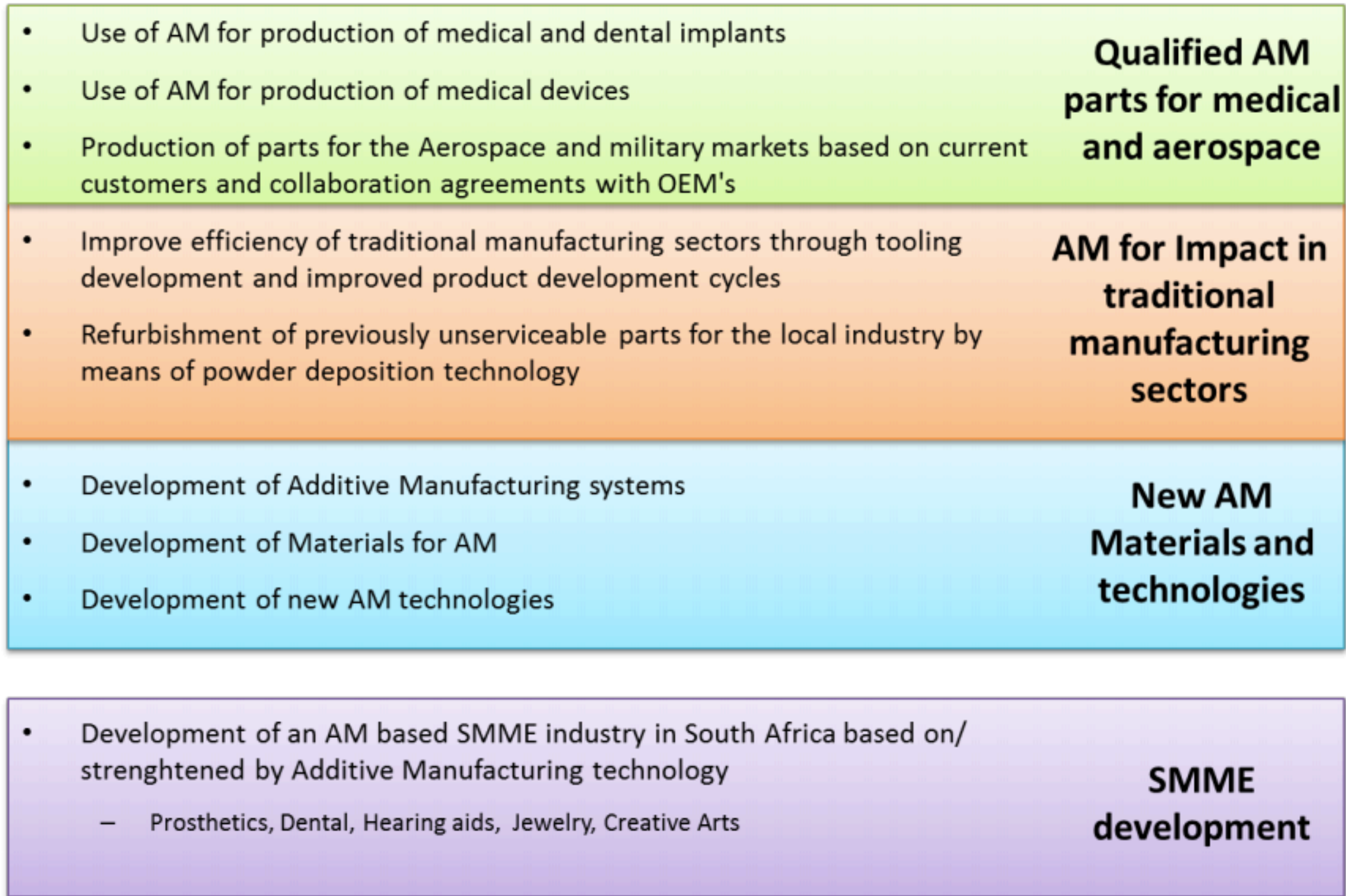
Supply and demand?

Why work in Africa?

Focus Area	Optical Sensing & Metrology	Lighting	Photonics for Communications	Photovoltaics	Laser-Enabled Manufacturing
Is there a significant global market?		Large (LEDs)	Large (all products)		
Is there a significant local market?					
Is the local market growing?		Niche LED	Fibre-based Communications	REI4P	Additive Manufacturing
Are there niche opportunities in the market?	Yes	Yes		Mostly Commodities	Yes
Are there existing firms in this area with strong capability?	Yes	Limited	Limited	Limited	Some
Is there strong university or science council expertise in this area?		Limited	University	University	Science Council
Is there a low barrier to entry?	Non-Medical Imaging	LED Devices	Difficult to Access	Solar Panels	Laser Refurbishment
<b>Overall Assessment</b>					
Proposed PISA Phase 2 Budget (R million)	37	51	54	40	27

March 2020 Review

25% increase in revenue/staff



Enabling capability development

Education system

Additive manufacturing

The most active group

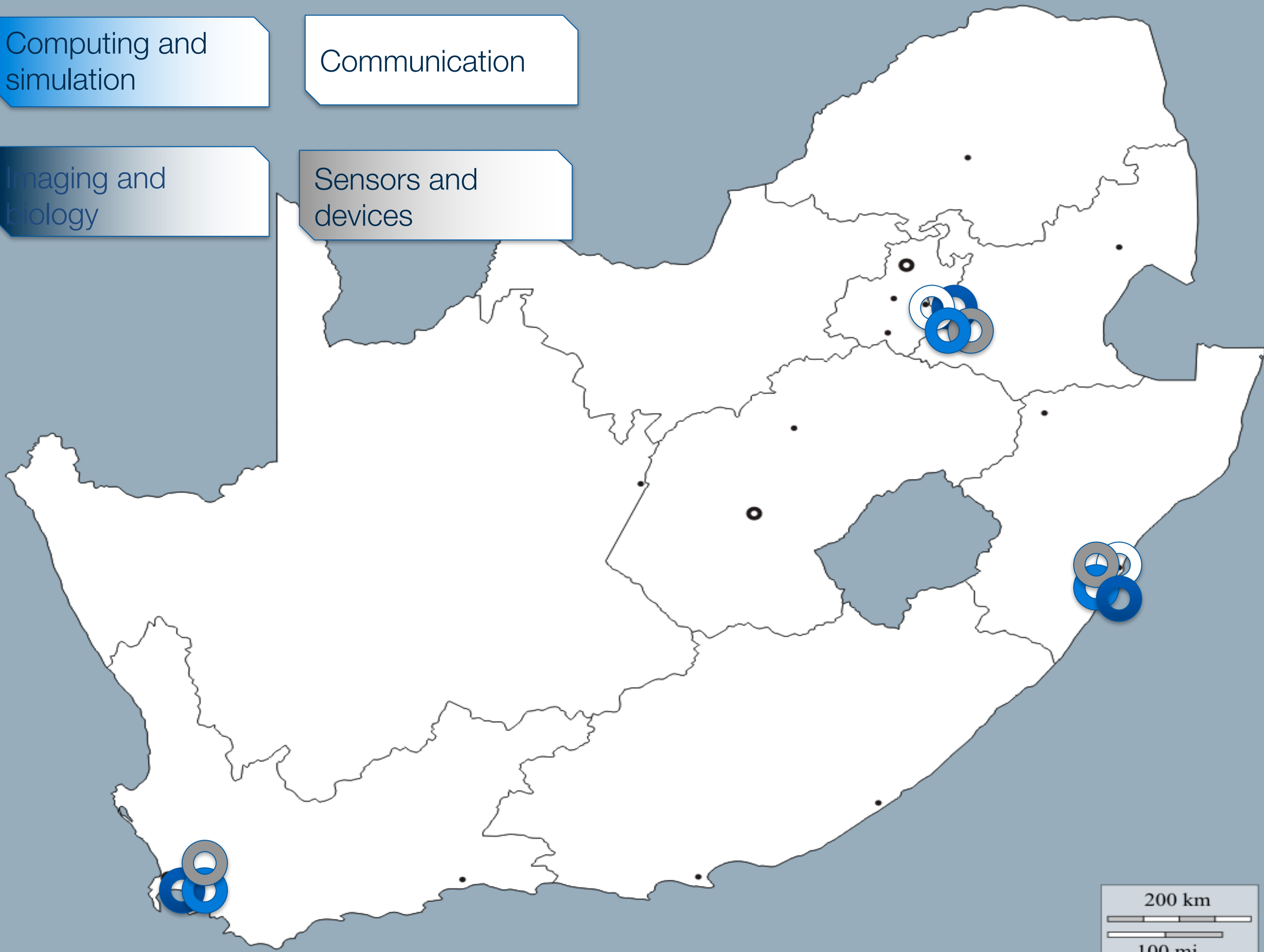


Computing and simulation

Communication

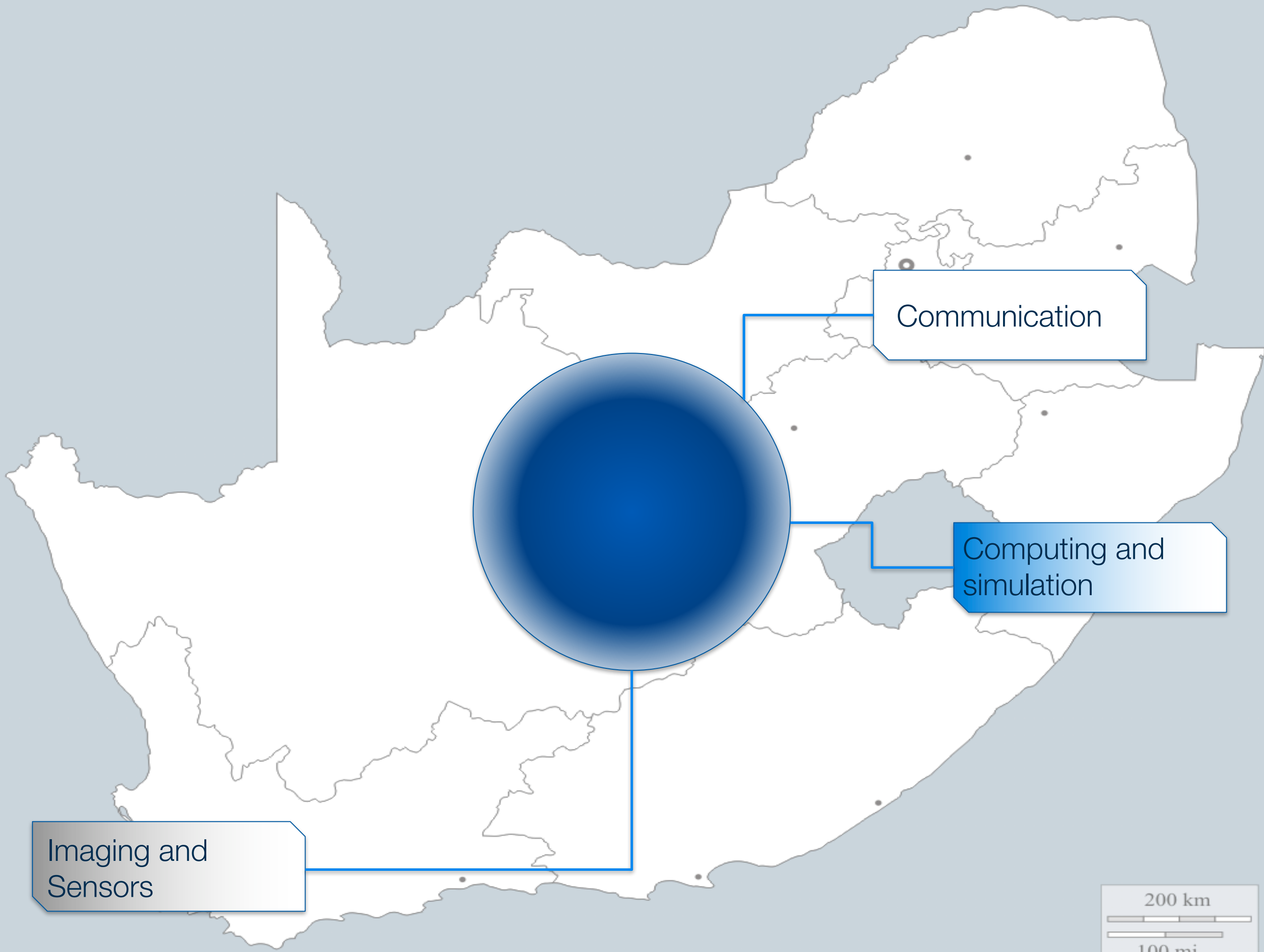
Imaging and biology

Sensors and devices



200 km

100 mi



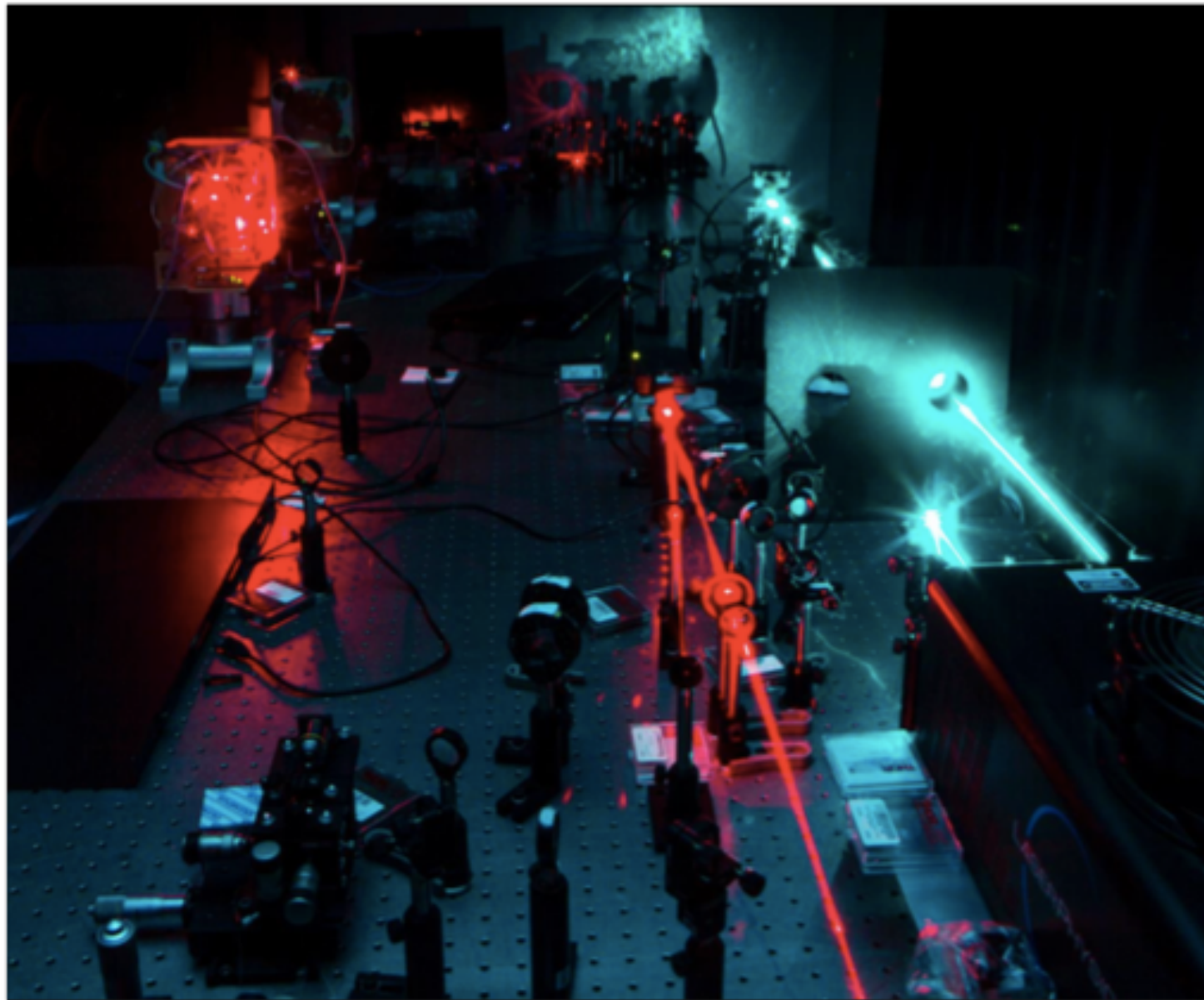
Communication

Computing and simulation

Imaging and Sensors

200 km

100 mi



# A Quantum Technology Roadmap for South Africa

Prepared for: Department of Science and Technology (DST)

Compiled by: Prof. Andrew Forbes (U. Witwatersrand), Prof. Francesco Petruccione (UKZN), and  
Prof. Hermann Uys (CSIR and U. Stellenbosch),

Updated: 7 July 2018

Version: 5



# Where is BRICS?

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We need discussion time and actions to create something concrete for our virtual centre:

- business clusters?
- BRICS pavilion at major events?
- research highlights?
- student exchanges?
- shared labs?





# Thank you

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