UNIVERSITÉ DES
MASCAREIGNES

SAVOIR, C'EST POUVOIR

Activities in

Mauritius

On behalf of:

University of Mauritius

Universite des Mascareignes

University of Mauritius

Assoc. Prof N Issur

- Mauritius Radio Telescope !!!
- Ionospheric scintillation monitor
  - SKA SA - SANSA - UoM
- Master in Radio Astronomy Techniques – ready to kickoff
- Undergrad project
  - RFI campaign on-going
  - Various radio astrophysics project
- CHPC SA - Ranger rack
  - Engineering dept.
  - Physics module

Universite des Mascareignes

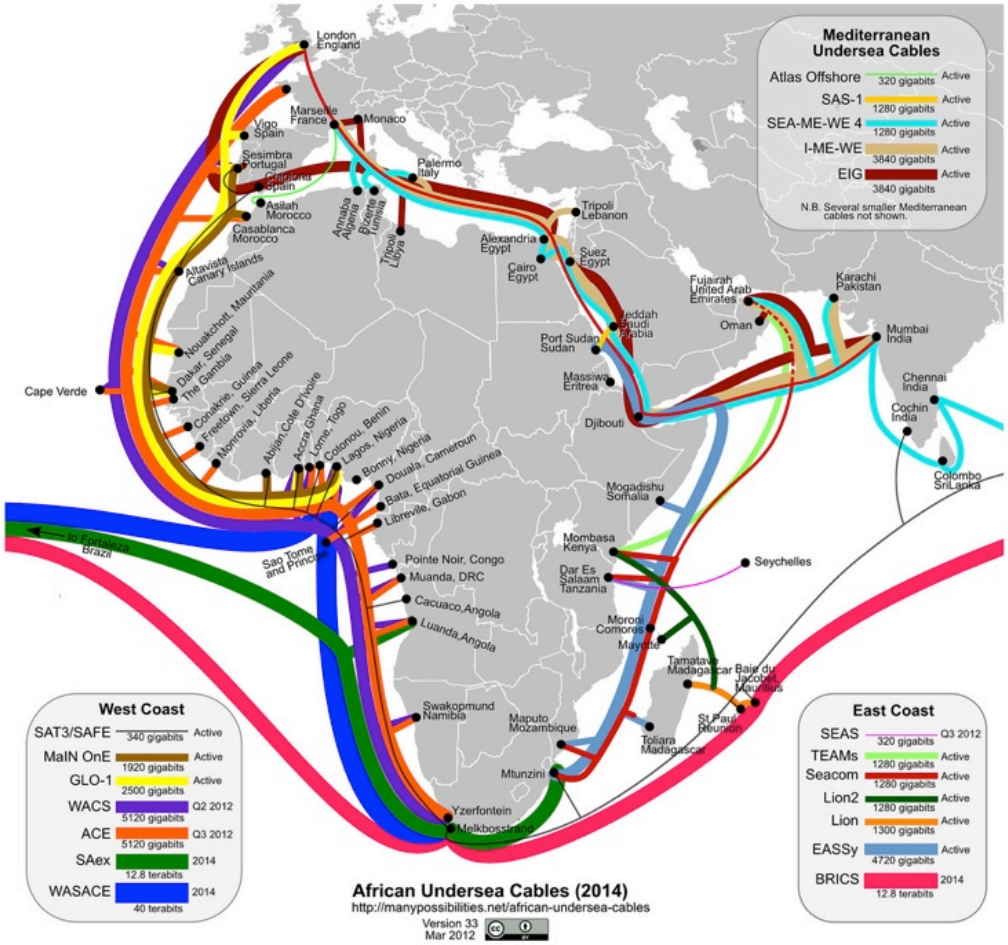
Assoc. Prof R Somanah (Director)

- Government agreed: UdM – official focal point of the Engineering/IT aspects of the AVN/SKA Africa
- AVN visit for RFI characterization plan in 2017
- Setting of Big Data Center and/or Center for High Performance Computing
- Engineering/IT (those without PhD) embarking into upgrading skills


KENYA
SOMALIA
INDIAN OCEAN
TANZANIA
SEYCHELLES
Agalega Islands
MAURITIUS
MALAWI
COMOROS
Cargados Carajos Shoals
MOZAMBIQUE
MADAGASCAR
Mauritius
Reunion (FRANCE)
Rodrigues
0 500 Miles
Rodrigues
uncovered at low tide
Port Mathurin
Grande Montagne
La Ferme
Petit Gabriel
AIRFIELD
Crab Island
Point Corail
INDIAN OCEAN
uncovered at low tide
Same scale as Mauritius.
Flat Island
Gabriel Island
Gunner's Quoin
Cap Malheureux
Cannoniers Point
Grand Baie
Goodlands
Île D'Ambre
Poudre d'Or
Triolet
RIVIÈRE DU REMPART
PAMPLEMOUSSES
Pamplemousses
Rivière du Rempart
River Citrons
INDIAN OCEAN
INDIAN OCEAN
Port Louis
Valton
PORT LOUIS
La Nicolière
Bon Accueil
Point Petite Rivière
Petite Rivière
Moka
L'Agrement
Quartier Militaire
Lalmatie
Centre de Flacq
FLACQ
Trou d'Eau Douce
Pointe Quatre Cocos
Bambous
Beau Bassin
Rose Hill
Quatre Bornes
MOKA
Montagne Blanche
Bel Air
Île aux Cerfs
Phoenix
Vacoas
Curepipe
Tamarin
River Tamarin
BLACK RIVER
PLAINES WILHEMS
Mare aux Vacoas
GRAND PORT
Nouvelle France
Pointe du Diable
Pavillon du Grand Port
Île aux Bénitiers
Grand Bois
Rose Belle
Plaine Magnien
Mahebourg
SAVANNE
Chemin Grenier
Rivière des Anguilles
Baie du Cap
Bel Ombre
Pointe Sud Ouest
Surinam
Souillac
Location of Present Study Site
Mauritius
District boundary
National capital
District capital
Road
Built-up area
0 5 Kilometers
0 5 Miles
The Agalega Islands and Cargados Carajos Shoals (St. Brandon) are administered from Port Louis, while Rodrigues has a resident commissioner.

Site selection

- Safe landing station
- Low level RFI
- Industry closing dow
- Accessible
- Rodrigues !!!
  - Power issue
  - Wind
  - Man power?



Conclusion:

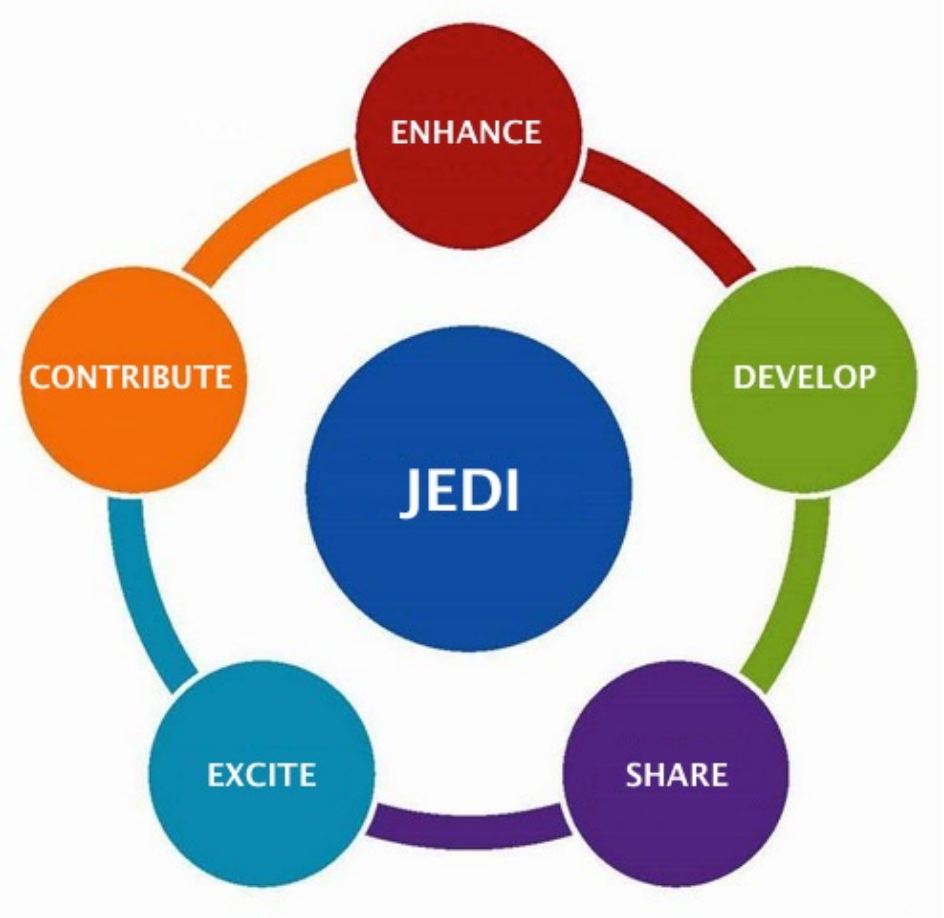
- Active in radio astronomy since 1992
- Awards by various organization for promoting astronomy (NASA)
- Full partner of SKA Africa
- Next 5 years ~ 1 dozen PhD in radio astronomy, Machine Learning, Algorithm development, etc …
  - **5th in the world for brain drain**
  - **Opportunities ?**

Joint Exchange Development Initiative (JEDI)

An Innovative, Smart, Transformational Human Capacity Development Programme

Joint Exchange Development Initiative (JEDI)

- Conceptualized & Initiated by Prof Bruce Bassett:
  - True learning occurs when students **actively engage** with material
  - Conferences advertise the result of years of research; they do not teach participants **how to do research**
  - Ability to **work in teams** is critical to modern research success
  - Research success requires **skills** in the most relevant topics and toolsets




THE UNIVERSITY OF MAURITIUS

JEDI IN AFRICA

Country	Year	Topics covered	Outcome
South Africa postgraduate and researcher	6 JEDI since 2008	• Astronomy & Cosmology • Statistics • Machine Learning & Big Data Science	6 refereed journal articles
Mauritius JEDI Undergraduate	2011	• A multi-wavelength view of cD/BCG galaxy • Searching for Supernovae in Galaxy Clusters with Large Imaging Surveys • What would be the impact of SKA for LSST Type Ia SN science?	2 students joined postgraduate in SA in 2012
MiniJEDI Undergraduate	2012	• 1st AstroPython workshop • Education and Public Outreach (EPO)	2 students joined postgraduate in SA in 2013
JEDI Undergraduate SuperJEDI Researcher	2013	• AstroPython • Virtual Observatory (VO) and data mining • Radio sources within the Galactic plane from the MRT survey	2 students joined postgraduate in SA in 2014 SuperJEDI - on-going international collaboration
MiniJEDI undergraduate	2014	• AstroPython • Introduction to Machine Learning • Kaggle problem solving	1 student to join postgraduate in SA in 2015 in Machine Learning
JEDI undergraduate	2015	• Machine Learning	1 student join SA in ML 1 refereed paper in ML **BeeCubes** – bridging STEM and Business
Kenya JEDI undergraduate	2013	• Introduction to Linux & Python • VO & statistics • Fitting techniques • EPO and communication skills	Single dish project by BSc(Hons) student Potential students applying for Master in Mauritius in 2015

JEDI IN AFRICA

Country	Year	Topics covered	Outcome
Namibia JEDI undergraduate	2014	• Understand Harmonics in Signals • Spectroscopic Data Reduction • Synchrotron Radiation modeling • Analytic and numerical study of resonance	Students still completing their undergraduates studies Python is extensively used by students in their studies
Cape Town AstroShop	2015	• Vision for African science in 5-10 Years	Proposal from all partner countries
Mozambique	2016	• Astronomy & Cosmology • Statistics	Curriculum for astronomy at Maputo 3 students intend to go for advance studies

JEDI & SuperJEDI outcome:

Is the Dynamics of Tracking Dark Energy Detectable?

Bruce A. Bassett, Mike Brownstone, Antonio Cardoso, Marina Cortês, Yabebal Fantaye, Renée Hlozek, Jacques Kotze, Patrice Okouma

Luminous Red Galaxies in Simulations: Cosmic Chronometers?

S. M. Crawford, A. L. Ratsimbazafy, C. M. Cress, E. A. Olivier, S-L. Blyth, K. J. van der Heyden

Statistical Classification Techniques for Photometric Supernova Typing

James Newling, Melvin Varughese, Bruce A. Bassett, Heather Campbell, Renée Hlozek, Martin Kunz, Hubert Lampeitl, Bryony Martin, Robert Nichol, David Parkinson, Mathew Smith

Results from the Supernova Photometric Classification Challenge

Richard Kessler, Bruce Bassett, Pavel Belov, Vasudha Bhatnagar, Heather Campbell, Alex Conley, Joshua A. Frieman, Alexandre Glazov, Santiago Gonzalez-Gaitan, Renee Hlozek, Saurabh Jha, Stephen Kuhlmann, Martin Kunz, Hubert Lampeitl, Ashish Mahabal, James Newling, Robert C. Nichol, David Parkinson, Ninan Sajeeth Philip, Dovi Poznanski, Joseph W. Richards, Steven A. Rodney, Masao Sako, Donald P. Schneider, Mathew Smith, Maximilian Stritzinger, Melvin Varughese

The star-formation history of mass-selected galaxies from the VIDEO survey

Jonathan T. L. Zwart, Matt J. Jarvis, Roger P. Deane, David G. Bonfield, Kenda Knowles, Nikhita Madhanpall, Hadi Rahmani, Daniel J. B. Smith

- JEDI:
  - http://arxiv.org/abs/0709.0526
  - http://arxiv.org/abs/1004.2378
  - http://arxiv.org/abs/1010.1005
  - http://arxiv.org/abs/1008.1024
- SuperJEDI:
  - http://arxiv.org/abs/1401.1648
- JEDI webpage:
  - http://jedi.saao.ac.za

SKA SA adopted JEDI as a component of its HCD

Big Data in Astronomy: A Potential Tool For Social Innovation (BArISt A)

Topics

- Advanced Linux & Python
- Big Data & Machine Learning
  - Radio Frequency Interference (RFI)
  - Search for Extraterrestrial Intelligence (SETI)
  - Social Media Data analysis
  - Business analytics using Big Data for Development
  - Exploring Hospital Quality
- Advancing the Development of Astronomy
- Research Communication

https://sites.google.com/ska.ac.za/barista

Registration Deadline: 10 June 2017

*"A room teeming with about thirty laptop screens, pairs of eyes glued to them, nimble fingers tapping away at the keyboards, fervent conversations interjected by jargons such as feature extraction, training set, over fitting, pooling layers, sobel filter, scikit image and the like, a whiteboard full of equations and codelets, and a heavy aroma of coffee. This might seem like the perfect picture of a San Francisco Data Science hackathon. Except, this scene took place couple weeks ago about 11,000 miles away from San Francisco. It happened in the tiny island nation of Mauritius, in the Indian Ocean about 1,200 miles off the southeast coast of Africa. I was one of the data science instructors of a career development workshop for young Mauritian and South African students, who were having their first stabs at a real life data science problem…."*Dr Sudeep Das, data scientist at Opentable, San Francisco. (adapted from his blog: https://medium.com/@datamusing/tiny-island-big-data-bigger-hearts-661f396c1295)

"Education is the most powerful weapon which you can use to change the world" - Nelson Mandela