



# Report from the Short Term Mission – STM

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<b>DATE OF THE STM:</b>	<i>23~27 APRIL 2018.</i>

# Report:

## 1. TOPIC:

### **VLBI Science Research Collaboration Between African VLBI Network & EVN**

- **OVERVIEW:** With the advent of the African VLBI Network, AVN, currently comprising of HartRAO and the Ghana 32-m telescopes, developing the VLBI operations technical knowhow as well as building VLBI community in Africa became a need. Gleaning from the experience of JIVE in VLBI operation and science is one aspect of the AVN could harness.
- **The Need:** AVN administer by the South African Radio Astronomy Observatory, SARAO, will require a robust operational framework to be able to sustain good science operations for a reasonable time. SARAO will benefit from learning from the operational structure of the EVN/JIVE and adapt it to the AVN. On the other hand, JIVE/EVN require a bridge in the UV distance between Europe and HartRAO (South African), and AVN Ghana provides such bridge. EVN will benefit from improved sensitivity provided by additional telescopes from the AVN when they join EVN sessions, thus getting AVN working well benefits Europe/EVN and is important to them.
- **Aims of the visit:** To designed an appropriate science operations framework for the AVN with a view to its participation in EVN observing
- **Accomplished goals of the STM:** I learnt the technicalities of VLBI science operations, and the support structure of JIVE to the EVN users.
- **Importance to RadioNet and SARAO:** Among the goals of RadioNet is fostering sustainable research environment through comprehensive networking and training opportunity. My STM fits well into this goal, while also boosting the cooperation between EVN (Europe) and SARAO (South Africa) in this era of the Square Kilometer Array which motivated the construction of the AVN.

## 2. PROPOSED AND PERFORMED WORK

- **Proposed work:** The main goal was to design a suitable science operations structure for the AVN
- **Performed work:** The following work was performed during my STM visit to JIVE: (1) Understudy JIVE's operational structure with the aim to adopting suitable aspects in the operational methods of the AVN. (2) Installation and testing of the JIVE SFXC correlator for fringe checks for AVN telescopes. (3) EVN NME data processing and VLBI data self-calibration with Difmap. (4) I prepared and delivered JIVE seminar. I also held discussions with the Director of JIVE, Dr. Colomer on AVN accessing the JIVE correlator for future test and scientific observations.
- **Technical know-how acquired:** (1) VLBI data correlation method. (2) VLBI scheduling method

## 3. CROSS-DISCIPLINARITY

- The visit was on opportunity for knowledge transfer from more experienced researchers at JIVE toward developing the VLBI capabilities of African scientist.
- I worked with the software engineers in charge of the JIVE correlator to learn how VLBI data correlation is performed and how to do it on a small chunk of data in a personal computer.

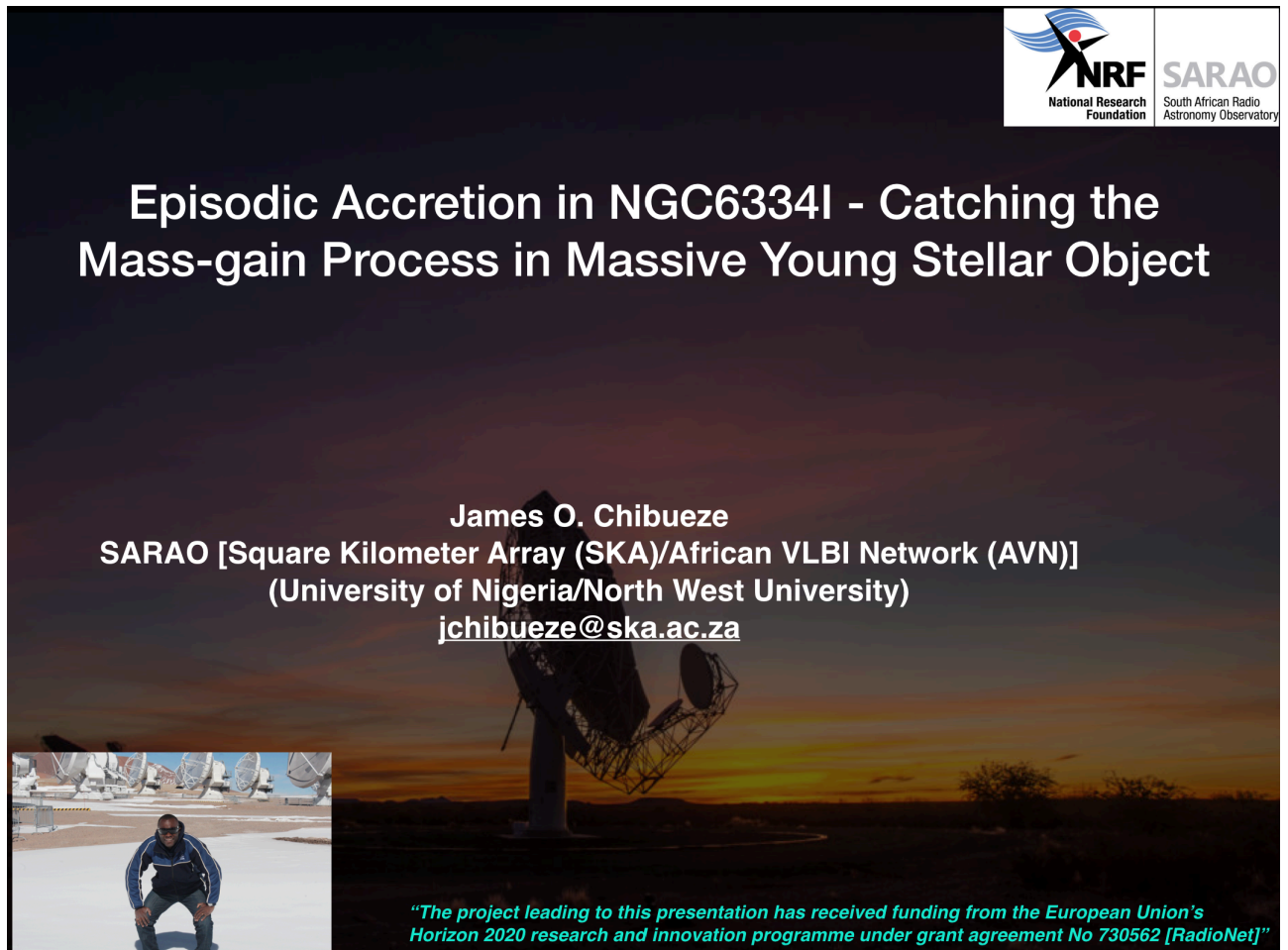
- *I learnt self-calibration method with Difmap from Dr. Zsolt Paragi. This useful for future VLBI data processing.*

#### 4. IMPACT

- *European radio astronomers and engineers have years of experience but the field is only being given attention in Africa. Knowledge transfer along with support from the European astronomers and engineers will have strong impact in the drive to build an African VLBI Network.*
- *As the AVN commissioning scientist, I am required to transfer the technical and scientific know-how of radio telescope usage to the AVN operations and scientific community in Africa. Thus, the skills I have acquired from the short JIVE visit will enable me to fulfill this role.*
- *I take part (as an instructor) in observational training programs using the AVN Ghana telescope both in the DARA (Development in Africa with Radio Astronomy) and SARAO organized training events. These training programs will afford me the opportunity to transfer the knowledge and skills that I have acquired to the African VLBI community.*

#### 5. PUBLICATIONS

- *No publication in this case, but I have duly acknowledged the RadioNet grant in my seminar presentation at JIVE (see the image below).*



**Episodic Accretion in NGC6334I - Catching the Mass-gain Process in Massive Young Stellar Object**

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