Report on the JSA/HUGS International Fellowship for Graduate Students in Developing Countries 2017

To the attention of the Initiatives Fund Evaluation Committee

The 2017 JSA/HUGS International Fellowships were awarded to

- Ms. Estefania Berrueta Martinez, a PhD student at Universidad Nacional de la Plata (La Plata, Argentina) working on neutrino scattering under the direction of Dr. Alejandro Mariano.
- Mr. David Molina, a PhD student at the Universidad Nacional de Colombia (Bogota, Colombia) working on charmonium and bottomonium spectra using quark models under the direction of Dr. Maurizio De Sanctis.
- Mr. Yves Omon, a PhD student at the University of Yaounde 1 (Yaounde, Cameroon) working on NaI detector efficiencies for nuclear physics experiments under the direction of Dr. Pierre Owono Ateba and Dr. Patrice Ele Abiama

additionally, Ms. Esther Othieno, a PhD student at Jaramogi Oginga Odinga University of Science and Technology (Kenya) under the supervision of Dr. Bernard Nyaare Okello who applied to attend to HUGS, was funded by the Physics Division under the umbrella of the Fellowship to cover her attendance to the school.

Selection process

The fellowship was officially announced on February 5, 2017 and applications received before the deadline of February 28, 2017, were given full consideration. The applicants had to provide a motivation letter and at least one recommendation letter to be submitted directly to the fellowship managers by the endorser. Recommendation letters directly provided by the applicants were not accepted. We received 10 applications: 2 from Argentina, 2 from South Africa, 1 from Mexico, 1 from India, 1 from Colombia, 1 from Rwanda, 1 from Central Africa, and 1 from Cameroon.

The selection committee members (Alberto Accardi, Bipasha Chakraborty, Cesar Fernandez-Ramirez, Rolf Ent, Jose Goity, Cynthia Keppel, Michael Khol, and Randall Evan McClellan) made independent evaluations on the candidates worth following the guidelines detailed in the Fellowship application and reported their own conclusions to the rest of the committee members through e-mail. The final selection was made by consensus. Out of the ten applicants, three outstanding students were considered worth of the fellowship: David Molina (Colombia), Yves Omon (Cameroon) and Estefania Berrueta Martinez

(Argentina), but we did not have enough funding to cover for all the three students. Fortunately, due to the high level of the candidates, Rolf Ent, on behalf of the Physics Division, offered additional funding to cover the travel expenses and one week additional visit to JLab for Ms. Berrueta Martinez. Furthermore, a fourth candidate, Esther Othieno (Kenya), who was worth of notice but had not applied directly for the fellowship but only to HUGS, was invited to attend HUGS completely funded by the Physics Division. The JSA funds plus the generosity of JLab's Physics Division and matching funds from the DOE grant sponsoring the HUGS school, will allow four talented PhD students from developing countries to attend 2017 HUGS and to stay an additional week at Jefferson Lab to start a collaboration with JLab researchers.

The dates of their stays were:

- David Molina from May, 29 to June 24, 2017, visiting the Theory Center
- Estefania Berrueta Martinez from May, 29 to June 24, 2017, visiting the Theory Center
- Yves Omon from May, 22 to June 17, 2017, visiting the Physics Division
- Esther Othieno from May, 22 to June 17, 2017, visiting the Physics Division

Note, in particular, that the additional week for the two African students, was planned on purpose to allow them to work with Ms. Bineta Sokhna Lo Amar from Senegal, who was awarded the JSA/HUGS fellowship last year and is visiting this year the Physics division to continue developing the collaboration started during HUGS 2016. This year at JLab, the three of them were be able to sow the seeds for more Nuclear Physics developments in their countries of origin, and more scientific exchanges with Jefferson Lab.

Budget, leveraged support and matching resources

Given the reduced budget granted to this program compared to the request, we still have been able to support 2 students, but granting them only one additional week to visit Jefferson Lab. Even so, this situation required Hampton U. to exceptionally pick up entirely the local transportation costs and the living expenses during that week, as well as part of the lodging expenses, in addition to the promised leveraged funds.

In detail, the awarded $4000.00 have been allocated as follows:

- $1,030.36 spent on flights Bogota-Atlanta-Newport News and Newport News-Atlanta-Bogota for Mr. David Molina
- $2,340.06 spent on flights Yaounde Nsimalen-Paris CDG-Atlanta-Newport News and Newport News-Atlanta-Paris CDG-Yaounde Nsimalen for Mr. Yves Omon
- $314.79 for 1 week lodging at the Residence facility for Mr. David Molina
- $314.79 for 1 week lodging at the Residence facility for Mr. Yves Omon

Totaling $ 4,000.00 from JSA Initiatives Fund. Hampton University contributed a total of $4,205.00 to cover lodging during HUGS, meals for the whole 4 weeks, local transportation, and $202 of the 4th week lodging costs that exceeded the funding available through this grant.

The Physics Division contributed a total of $4,600.00 to cover flight, transportation, extra week lodging to extend the program to two more international

students: Estefania Berrueta-Martinez and Esther Othieno.

The total cost of the program has been

	$4,000.00	(JSA)
+	**$4,205.00**	(HU)
+	**$4,600.00**	(PHY)
=	**$12,805.00**	

Fellows activities

The fellows spent four weeks at Jefferson Lab. Three of these were devoted to attending the HUGS lectures and participated in all activities within the school, including scheduled social meetings with the lecturers and delivering short presentations in front of their fellow attendees to HUGS. As supplemental material, we enclose the exit reports by Ms. Estefania Martinez Berrueta, Mr. David Molina, Mr. Yves Omon. Unfortunately, the poor Internet connectivity in Kenya and the recent elections related unrest have not yet allowed Ms. Othieno to send us an exit report.

Ms. Estefania Martinez Berrueta's activities

After HUGS, Estefania Martinez Berrueta stayed an additional week at JLab funded by the physics division to interact with researchers. Ms. Martinez was provided with office space in the Theory Center where she could work and interact with JLab researchers:

- She gave a seminar for the Theory Center entitled "(Anti)neutrino Scattering"
- She had meetings with the following researchers:
  - Jose Goity (JLab Theory Center)
  - Eric Christy (Hampton University)
  - Alberto Accardi (HU and JLab Theory Center)

Mr. David Molina's activities

After HUGS, David Molina stayed an additional week at JLab mostly funded by the fellowship to interact with researchers. Mr. Molina was provided with office space in the Theory Center where she could work and interact with JLab researchers:

- He gave a seminar for the Theory Center entitled "Charmonium and Bottomonium Spectra with a Dirac Potential Model in Momentum Space"
- He had meetings with the following researchers:
  - Robert Edwards (JLab Theory Center)
  - José Goity (JLab Theory Center)
  - Emanuele Nocera (Oxford U. & JLab Theory Center visitor)

Mr. Yves Omon's activities

Before HUGS, Yves Omon stayed an additional week at JLab funded by the JSA fellowship to interact with researchers. Mr. Omon was provided with office space in the Physics Division where he could work and interact with JLab researchers:

- He had meetings with the following researchers:
  - Paul Gueye (HU)
  - Alexander Camsonne (Hall A, JLab)
  - Bineta Amar (Senegal & JLab Physics Division visitor)
  - Cynthia Keppel (JLab, Hall A&C)

Ms. Esther Othieno's activities

Ms. Othieno also visited the theory division at JLab the week prior to the beginning of HUGS, and was provided with office space in the Physics Division, which allowed her to connect strongly with Mr. Omon and Ms. Amar, fellow African Ph.D. students.

Ms Othieno is a very promising Ph.D. student of Mathematical Physics, but with limited background in Nuclear Physics, a topic about which research possibilities in Africa are very limited. Therefore she spent most of her first week to study and prepare herself for the HUGS school under the direction of Alberto Accardi, Jose Goity, and Paul Gueye (HU & JLab). Furthermore, she had various meetings and discussions with Cynthia Keppel (JLab). This allowed her to benefit at the most from the HUGS school.

In fact, after attending HUGS and after the very positive experience she had at JLab, she decided to pursue a career in Nuclear Physics and started discussing plans to achieve this goal with Drs. Accardi, Gueye and Keppel.

Final considerations

The quality of the candidates was outstanding and awarding the fellowships proved to be a difficult task. Nevertheless we believe we selected the best candidates and that we gave Mr. Yves Omon Mr. David Molina, Mrs. Estefania Berrueta an opportunity for learning and career enhancement that otherwise would have not been available to them. We also provided funding to a fourth worthy candidate, Ms. Esther Othieno through the Physics Division. We are very pleased that they really took advantage of the possibility to present a seminar at JLab, intensely discuss with JLab researchers, and lay the groundwork for future collaborations. In our estimation this initiative has been very successful and has met all the objectives of the proposal.

We would like to highlight the high quality level of the candidates. Our initial goal in the proposal was to fund two students for their trips and two additional weeks. For this purpose we requested $ 6,040.00. We were awarded $4,000.00 from the JSA Initiatives Fund, what made difficult to fully cover two students as originally planned (we had to cut from 2 to only one additional week).

Besides, the fact that past year's fellow Ms. Bineta Sokhna Lo Amar from Senegal visited JLab to continue her research with Prof. Paul Gueye and to meet with this year's fellows from Africa Mr. Yves Omon and Ms. Esther Othieno shows the potential of this fellowship to make a mark on developing nuclear physics research in developing countries.

This shows how fellowships of this kind are in great demand and how important its impact can be. We also would like to thanks the Physics Division for providing additional funds ($4,600.00), that allowed to fund two additional students to attend HUGS and visit JLab.

Sincerely,

Cesar Fernandez-Ramirez, PI Alberto Accardi, co-PI

OMON Yves
Ph.D student at the University of Yaoundé 1, Cameroon.
Option: Atom and Radiation
Laboratory of Nuclear Physics.
Nationality: Central African Republic.
Email: omonyves@yahoo.fr

Bangui, the 05 July 2017

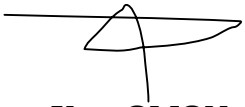
TO WHOM IT MAY CONCERN,

I am a Ph.D student in the 3rd year of Physics at the University of Yaoundé 1, in Cameroon. My thesis topic is: **QUANTITATIVE STUDY OF THE NaI (Tl) DETECTOR EFFICIENCY VARIATION**. I would first like to thank the Director of JLab and his team for the good success of HUGS 2017 in very good conditions. This year, JSA / HUGS awarded me an international scholarship for Graduate Students in developing countries, which had fully covered all my spending to attend the 32nd Annual Program of Graduate School of Hampton University (HUGS) 2017 at the Jefferson Lab, and to visit a week the theoretical center of Jeferson Lab before HUGS 2017. I had come a week before HUGS 2017, and it was an opportunity for me to present my work to research thesis and discuss with the various experts who Are working on nuclear instrumentation. As an example, I had worked on my thesis project with **Dr. Paul GUEYE** during my 1st week and also with **Dr. Alexander**. They brought further information about my work that I had not been able to use. Our different discussions with the experts and their various criticisms and advice on my results prompted me to reorganize my work. During the three weeks I learned a lot about particle interactions In the kernel, especially on QCD. The conferences in HUGS have been an extraordinary experience for me, and especially on the interactions of particles in the nucleus. We also visited different laboratories for measurements with equipment. The discussions were very interesting between the researchers and the Teachers during the three weeks of the school. In my University in Cameroon, I have problems with materials for my measurements in the lab and discuss my work.
But, the timetable was very short to discuss in depth. I want to strengthen my research collaborations at the JLab in a working group like the radiation group, to allow me to finish my measurements and to support my thesis under good conditions. And I wish I had more chances to visit Jefferson's lab in the future.

I rely heavily on JSA / HUGS to help me complete my measurement work at the JLab in the future.

Best Regards,

Ph.D student



Yves OMON

Cra 45 # 26-86
Edificio 405
oficina 213
Bogotá, Colombia
June 29, 2017

Dear HUGS managers

First of all, I would like to express my thanks to HUGS organizers for honoring me with the Fellowship for Graduate Students in Developing Countries.

This fellowship was composed of two parts: HUGS summer school and one extra week in the Thomas Jefferson National Accelerator Facilities.
The total experience, was pretty important in my academic and professional background.
Due to I am doing my Ph.D in the "Universidad Nacional de Colombia" and my thesis is about meson spectroscopy, particularly using relativistic potential models , all conferences were absolutely interesting for me, both the general and particular topics.

Nevertheless, I would like to highlight the lectures most important for me:
Michael Pennington's lectures, called "Hadron spectrum": the clarity of this talk is something important to highlight. In that talk, the speaker presented the main features of the hadron spectroscopy, both what already we knew and the puzzles associated with this interesting topic.
Emmanuele Nocera's lectures, called "Fragmentation Functions and Global QCD Fits"
Although this is slightly far from my research topic, the parton distribution functions PDFs was a topic which caught my attention and it has become a topic of my interest.
Lastly "Introduction to Lattice QCD" by Bipasha Chakraborty. This topic is maybe the most important to me due to is a possible way to continue studying the hadronic physics in a most fundamental way. Despite the theoretical and computational tools are complicated I think that this is a topic for my future research.

On the other hand, the visit to the experimental locations was something remarkable for me.
That shows me the huge effort made in Jefferson Laboratory for improving our knowledge of particle physics.
The interactions with others students were rewarding, particularly because was possible established talks about different topics related to my research.

With regard to the last week on the theoretical center of Jlab was very important. In that week I tried to find possible collaborations in different topics like Lattice QCD with the Dr Robert Edwards and PDFs with Emanuele Nocera. Also was possible to have interesting conversations with some Posdocs as Jose Alarcón.
In summary, all experience was completely useful and enriching for my career right now and the future, because allowed me to share with excellent researchers and outstanding students of all world and because was possible show my work in front of a lot of possibles futures collaborators. This kind of fellowships is the only way, for people of developing countries, for to go to this type of academics events. I hope, this scholarship goes on for other people in the next years.
Thank you so much for this amazing opportunity.
Best regards

David Julian Molina Beltrán.

Lic. Estefanía Berrueta Martínez
Instituto de Física La Plata
1900, La Plata
Argentina
✉ *eberruetam@gmail.com*

To whom it may concern, 17 de julio de 2017

I am a PhD student at the University of La Plata, Argentina. My work consists mainly on developing models for neutrino and antineutrinos scattering on nucleus. This year I was granted the JSA/HUGS International Fellowship for Graduate Students in Developing Countries, which fully covered my expenses to attend the 32th Annual Hampton University Graduate Studies Program (HUGS), and to stay an additional week at the Thomas Jefferson National Accelerator Facility (Jefferson Lab).

Because of the subject of my PhD. thesis, all lectures of the program were very interesting. In particular I found Introduction to QCD (Jianwei Qiu), Electron Scattering Experiments (Wouter Deconinck), Nuclear Structure Studies and Short-Range Correlations (Or Hen), Hadron Spectrum from Experiment: A Window on Color Confinement (Mike Pennington) lectures of great interest and very useful for the development of my thesis.

Being combined theoretical-experimental lectures, experimental lectures where enlightening, as well as the tour of the laboratory facilities.

Also I really enjoyed the Physics Careers Workshop, although in my country the statistics are different, there is always a possibility to leave the academic life either by own decision or by the reduction of possibilities and is good to know about other challenging possibilities out of academia.

Staying at SURA Residence Facility during that month was something that exceeded all my expectations, not only for the treatment they offered me and the comfort of the place, but also because it gave me the possibility of interacting and bonding with other students of many different nationalities, which allowed me to not only inquire about the different scientific systems in their respective countries but also very beneficial because it promoted interesting discussions on the many varied subjects in which they are developing their PhD research.

At my institution, I have very little opportunity to discuss my work since most research in my university includes topics that are only slightly related to my line of work. For this reason, the additional week after the HUGS program was very advantageous. It was a unique opportunity to discuss different aspects concerning my area of interest.

The first meeting was with Dr. José Goity who had already listened the seminar I had presented at HUGS so he gave me a screen about which researchers of Theory Center were dedicated to things that could be related to my research and suggested to attend the Annual Users Group Meeting. That I did. Then I was introduced to Dr. Eric Christy who very generously and patiently told me about his work at Minerva experiment.

At the middle of that week, I was given the chance to present my work in the Theory Center Seminar. I was introduced to the post doc student Dr. Jose Manuel Alarcon Soriano that gave

an overview of his work on Effective Chiral Theories. Then I had the chance to talk to Dr. Alberto Accardi, who I had already meet at HUGS and was an excellent program director who gave me his support and encourage me to give the HUGS seminar, at the meeting he didn't only told me about his work but gave me some contacts and information about future schools of my interest. Finally I had a meeting with Dr. Cynthia Keppel and Dr. Rolf Ent with whom I had a brief discussion of their work and gave me the opportunity to give feedback of my experience at HUGS and the extra week at JLab.

I fully profited from the additional week at Jefferson Lab. Nonetheless, I have to admit that the schedule was very tight and more time would have been very useful to meet with more researchers. I look forward to strengthen research collaborations and hope to get other chances to visit the Jefferson Lab in the future.

Because of the lectures at HUGS and the discussions this visit enabled me to hold, both with students and specially with researchers working at the Jefferson Lab, I strongly believe this experience will have a deep impact on my professional future. And due to the fact that I have no funding to cover any travel or logging expenses this experience would not have been possible without the full financial support from the JSA/HUGS Fellowship. Therefore, I am very grateful to have been given this very enriching opportunity.

Best regards,

Lic. Estefanía Berrueta Martínez