

Jefferson Science Associates, LLC
Managing and Operating the Thomas Jefferson National Accelerator Facility
for the U.S. Department of Energy

FY2018 JSA Initiatives Fund Proposal Summary Sheet

Proposal title

Project Start Date (month/year)

Project End Date (month/year)

New
proposal

Renewal

**Total funds
requested**

Total leveraged support / matching
funds. Details of funds must be
included in budget proposal.

To be completed by JSA: Total funds awarded

Principal Investigator (PI)

Institutional affiliation
Mailing address
Email / phone #

Co-PI (if more than 1, add
pages with information)

Institutional affiliation
Mailing address
Email / phone #

Check one category: If PI is a Lab employee, your identification of the appropriate Associate Director below represents the acknowledgement of that AD with your submittal of proposal. No signature required.

Lab employee: Identify Associate Director (email /
phone)

Lab user: Identify University affiliation (email / phone)
Joint appointee: identify University and Lab division
association (email / phone)

Other: Identify Institutional affiliation (email /
phone)

Proposal: Attach file with

- (1) **Executive summary and technical proposal**
- (2) **Synopsis of scientific, educational, technical, and/or business merits, and alignment with and significance to Lab's current program**
- (3) **Proposed evaluation plan to measure success.** If this is a request for renewal of funds, assessment of prior year performance,

Your proposal may include letters of endorsement and other supporting information (maximum of 12 pages including this summary sheet and budget sheet)

Budget Proposal

Proposal Title

Principal Investigator (PI)

Total funds requested

To be completed by JSA: Total funds awarded

	Item Description		Amount
<p>Equipment. Lab users submitting proposals that include equipment to be used at the Lab must review with the appropriate Lab Associate Director. The provision of the name of the AD below represents the AD's acknowledgement. No signature required.</p>			
	Associate Director: _____		
	_____	_____	
	_____	_____	
		Subtotal Equipment	
<p>Travel Support. Provide break-out of estimates for registration fees, lodging and transportation, catering, and facility charges (room rentals, AV equipment; etc.)</p>			
	_____	_____	
	_____	_____	
	_____	_____	
		Subtotal Travel	
<p>Supplies</p>			
	_____	_____	
	_____	_____	
		Subtotal Supplies	
<p>Consultants/Subcontracts</p>			
	_____	_____	
	_____	_____	
		Subtotal Consultants/Subcontracts	
<p>Other Expenses. Examples include stipends and honoraria, prizes, awards.</p>			
	_____	_____	
	_____	_____	
		Subtotal Other Expenses	
		Total Budget Proposal	

Budget Justification: Include narrative to explain need for each line item in the budget, showing breakdown of calculations used to arrive at the amount in each line of the budget. Note that the JSA Initiatives Fund Program does not support salaries and salary-related expenses, or indirect expenses.

Leveraged Support/Matching Funds information. Identify the source, type and amount of dollar funds from each institution. Include **separately** estimated value of in-kind support. Your identification of the authorized representative who has committed institutional support for your proposal represents the acknowledgement of that individual. If support or funds are provided by the Lab, identify the associate director (or equivalent) as the authorized representative. Information may be included on separate page.

JSA/HUGS International Fellowship for Graduate Students in Developing Countries for FY2018

1 Executive summary and technical proposal

The Hampton University Graduate Studies Program (HUGS) has run this past June 2017 its 32nd edition, and has by now become an integral part of Jefferson Lab and its mission to train the future generation of nuclear physicists. The HUGS program at Jefferson Lab, run by Hampton U. in close collaboration with JLab's Physics Division and Theory Center, is a summer school designed for experimental or theoretical nuclear and particle physics graduate students who have finished their coursework and have at least one year of research experience. Students who are well into a research project are encouraged to apply as well. Acceptance into the program is competitive, and in the last edition 37 students attended the school out of 50 applicants.

Due to its international nature and recognized high quality, the HUGS program attracts students from different institutions, mainly from the USA and Europe. However, in the last few editions we found a growing interest by students from Latin America and Africa, as well as China and other less well endowed Asian countries. Unfortunately our funding from DOE does not allow to cover travel expenses from foreign countries to the USA, so that deserving students from foreign institutions have to find their own means to pay for their trip to the USA. This constraint is particularly acute in the case of students from developing countries where travel funding is scarce.

In order to overcome this inequality, three years ago we established, with the JSA Initiatives Fund support, the "JSA/HUGS International Fellowship for Graduate Students in Developing Countries" to cover one or two students' trip and one or two additional week(s) at Jefferson Lab.

During these three years we have assessed the high demand for this kind of funding and based on the success of the fellowship, we intend to renew program and to request funding for two students to attend the school and spend two additional weeks at Jefferson Lab. The two students will be selected by the same committee that reviews the applications to the HUGS program, which for the 2017 HUGS edition was composed of Alberto Accardi, Bipasha Chakraborty, Cesar Fernandez-Ramirez, Rolf Ent, Jose Goity, Cynthia Keppel, Michael Khol, and Randall Evan McClellan.

2 Synopsis of scientific, educational, technical, and/or business merits, and alignment with and significance to Lab's current program

The HUGS summer program at Jefferson Lab, which is run in collaboration with Hampton U. and has become an integral and internationally recognized part of JLab, is a summer school designed for experimental or theoretical nuclear and particle physics graduate students who have finished their coursework and have at least one year of research experience.

The JSA/HUGS fellowship will expand the HUGS program allowing two students from a developing country a unique opportunity, not otherwise available to them, to participate in the 3 weeks long summer school and to visit JLab for two additional weeks following that. The selected student will not only receive a top quality advanced training at HUGS, but will have the opportunity to meet with Jlab researchers and users to initiate or strengthen a research collaboration.

If funding is allocated to the JSA/HUGS fellowship it will increase the impact of Jefferson Lab throughout the physics community, empowering researchers with a training not available in their countries and providing a pathway to new collaborations to strengthen the laboratory's mission.

Empowering young researchers from developing countries will benefit the future of Jefferson Lab in a more indirect, but not less important way. Through excellence, those researchers will, hopefully, improve the scientific system and increase funding for science in their own countries. We will help building a new generation of JLab users in countries that not many years from now could become major players within the scientific community.

We see this application as a new step in the ongoing search for excellence and international recognition of both HUGS and Jefferson Lab.

Together with this proposal we enclose the report on this year's fellowship, the reports of this year's fellows as well as a list of past fellows so the Initiatives Fund Evaluation Committee can evaluate the impact of our proposal.

3 Proposed evaluation plan to measure success

The progress of the students during the school will be monitored closely by the school managers and the school director as it is done with every student that attends HUGS. In addition, the school managers will provide guidance and put the student in contact with those researchers at Jefferson Lab that can help the student to pursue his or her own research interests during the additional weeklong stay at the laboratory.

The evaluation of the success of the fellowship will be performed firstly in the same way that the success of the school is monitored, i.e., from direct feedback from the student during his/her stay student and secondly keeping track of the career of the student. We will also seek information on the impact of the received training by contacting the student and the PhD advisor regularly, and keeping track of publications resulting from collaborations with JLab staff and users.

In particular we highlight that past year fellow Ms. Sokhna Bineta Lo Amar is currently working on Jefferson Lab's physics with Prof. Paul Gueye and during 2017 she visited Jefferson Lab for a month supported by the Physics Division.

Sincerely,

Cesar Fernandez-Ramirez (PI) and
Alberto Accardi (co-PI and Director of HUGS)

4 Appendix: List of Fellows

Since the program started in 2015, 7 PhD students (4 women and 3 men) from developing countries have benefited this program. The full list is:

2015 *Cintia Willemyns* (Argentina)

- Explicitly thanks Jefferson Lab hospitality and researchers in the acknowledgements of Phys. Rev. D93 (2016) 034007]

2016 *Sokhna Bineta Lo Amar* (Senegal)

- Continues her research with Dr. Paul Gueye (Hampton University)
- Visited Jefferson Lab in 2017 supported by the Physics Division

Sangem Rajesh (India)

2017 Supported by the JSA fellowship

David Molina (Colombia)

Yves Omon (Cameroon)

Supported by the Physics Division

Estefania Martinez Berrueta (Argentina)

Esther Othieno (Kenya)

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

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

$$\mathbf{\$4,000.00} \text{ (JSA)} + \mathbf{\$4,205.00} \text{ (HU)} + \mathbf{\$4,600.00} \text{ (PHY)} = \mathbf{\$12,805.00}$$

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

Dr. Alberto Accardi
Department of Physics
Hampton University
and Cesar Fernandez Ramirez
Instituto de Ciencias Nucleares
Universidad Nacional Autonoma de Mexico, Mexico

July 16th, 2017

Dear Alberto and César,

I am very supportive of the proposal you are submitting to JSA for continuation of the funding of foreign graduate students from developing nations to attend the HUGS summer school. HUGS is the premier graduate summer school in nuclear and hadronic physics, and is attended by US and International students. HUGS supports local expenses and some domestic travel, but cannot support international travel. Unfortunately this limitation means that students from developing nations have to often decline their participation due to the high travel costs. This limits the global impact of HUGS, which is very unfortunate, as there is growing interest and participation of scientists of developing nations in Jefferson Lab physics. Having served for many years in the HUGS program, I can assure you that all students we have had from developing nations were outstanding, and the HUGS program served them very well by broadening their knowledge and horizons.

The experience of the last three years of support by JSA could not be more positive. All students who were awarded the scholarship were outstanding in their commitment and effort to reap maximum benefits from HUGS. The idea of further enhancing the experience by extending the visit of the students to Jefferson Lab is in my view very good. At an additional cost which is relatively small, we would be able to add substantial benefits to their visit. This would not only be in the form of scientific knowledge but also it will create scientific contacts between student and JLab scientists which in the long run may prove extremely beneficial. One example of this is Mrs. Bineta L. Amar from Cheikh Anta Diop University, Dakar, Senegal, who attended two years ago, and returned in 2017 to collaborate with scientists of Hampton University and Jefferson Lab.

The experience of three years of JSA support has proved very useful for the purpose of educating young physicists from developing nations in the areas relevant to Jefferson Lab physics. It is also showing the development of longer term scientific connections between those young scientists and Jefferson Lab scientists. The results are very encouraging, and therefore I wish to very enthusiastically recommend the continuation of the JSA developing country student support as well as the extension of that

support to a longer visit to JLab for the upcoming HUGS 2018 program.

Regards,

A handwritten signature in black ink, appearing to read 'J. Goity', with a stylized flourish at the end.

Dr. José L. Goity
Professor of Physics,
Hampton University, and
Senior Staff Scientist,
Jefferson Lab
12000 Jefferson Ave.
Newport News, VA 23606, USA

email: goity@jlab.org

Ph: 757-269 7345

August 11, 2017

Dear Colleagues;

I am writing this letter to express my support for the proposal to the JSA Initiative Funds Program for the “JSA/HUGS International Fellowship for Graduate Students in Developing Countries.” I am particularly interested in this program, having served for some years in the past as Director of the Hampton University Graduate Studies (HUGS) School. HUGS has become a successful and integral part of Jefferson Lab and its mission to train the future generation of nuclear physicists. The International Fellowship is an excellent addition to this successful program.

Due to its international nature and recognized high quality, the HUGS program attracts students from different institutions around the world. We have in this regard seen an increasing number of applications from countries where students may have no other access to this kind of science and/or no way to take part in it if they can’t travel to the school. There is a growing interest from students in Latin America and Africa, as well as China and other less wealthy Asian countries. Unfortunately, the HUGS grant funding from the Department of Energy does not allow for coverage of travel expenses for students from foreign countries to the USA – although they can be covered once here. This restriction disproportionately has a negative effect on deserving students who do not have institutional support and may have to find their own means to pay for their trip to the USA.

Not to be too emotional, but I can’t help but share a story from one of the African students who we worked with this Summer. She came here early in order to experience the laboratory and learn some electron scattering to prepare in advance for HUGS. These additional two weeks at Jefferson Lab are an essential part of the program to create future ties between the students and JLab’s research. I had an informal close-out with her to hear her thoughts about the program and how we might keep in touch to help her along with her future career if it led to nuclear science. She shared that she had no idea that such amazing ideas existed as those we probe at the laboratory and said that the Summer opened her world and that now she knew what she would dedicate her life to. I gave her then a book of mine that we had been using for her to learn with in advance of HUGS for her to share with other students at her home institution and also have as a reference at which point tears actually welled up in her eyes. It is difficult for us to understand the huge gap in what we take for granted as far as the scientific opportunity here at the laboratory and what some students in the world experience. It is clear to me that, while this JSA/HUGS program is small, it can make a big difference for at least a few such young scientists.

Empowering young researchers from developing countries will also benefit the future of Jefferson Lab in a more indirect, but not less important way. Through excellence, those researchers will, hopefully, improve the scientific system and increase funding for science in their own countries. They may expand the future user base into countries where we presently have no one. Funding allocated to the JSA/HUGS fellowship can increase the impact of Jefferson Lab

throughout the physics community, empowering researchers with a training not available in their countries and providing a pathway to new collaborations to strengthen the laboratory's mission.

For all of the above reasons, I am pleased to lend my full support to this proposal.

Sincerely,



Cynthia Keppel, PhD
Hall A and C Experimental Group Leader
Thomas Jefferson National Accelerator Facility