

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.

Light Cone 2018

LOCAL ORGANIZATIONAL COMMITTEE

—

Wally Melnitchouk (chair) – JEFFERSON LAB

Raul Briceño – OLD DOMINION UNIVERSITY

Chuang R. Ji – NORTH CAROLINA STATE UNIVERSITY

Andrea Signori – JEFFERSON LAB

I. SUMMARY

The series of Light Cone conferences has brought and continues to bring scientists together with the goal of finding a rigorous description of hadrons and nuclei from first principles in quantum chromodynamics (QCD). Historically, the primary research focus of the conference has been to exploit tools based on light-cone quantization methods. More recently, the conference has broadened its scope to use a more holistic approach, with the same scientific goal of bridging our microscopic and macroscopic pictures of nuclear physics. With this same aim, the Light Cone community has always promoted a strong relation between theoretical and experimental efforts, which is best embodied by one of its main goals: “to assist in the development of crucial experimental tests at hadron facilities”. Given that we are just entering the 12 GeV era and that the community is already looking forward to the EIC, we are proposing to organize a timely scientific program focusing on the frontiers of nuclear, hadron, and particle physics. In particular, the Light Cone 2018 (LC2018) conference will be held at Jefferson Lab during May 14-18, 2018 with a scientific program that will address the following physics topics:

- hadronic structure,
- meson and baryon spectroscopy,
- parton physics,
- finite temperature and density QCD,
- few- and many-body physics.

The cutting-edge understanding of each of these fields requires a range of theoretical and phenomenological tools. This meeting will plan to cover the following formalism frameworks and tools being used in the field:

- light-front field theories,
- lattice field theory,
- effective field theories,
- phenomenological models,
- present and future facilities.

The conference will be the latest edition of a series that started in 1991, and which is held approximately every year. The previous conferences were held in Heidelberg, Germany (1991), Tatra Mountains, Poland (1995), Ames, IA (1996), Lutsen, MN (1997), St. Petersburg, Russia (1998), Korea (1999), Adelaide, Australia (1999), Heidelberg, Germany (2000), Trento, Italy (2001), Los Alamos, NM (2002), Durham, UK (2003), Amsterdam, the Netherlands (2004), Cairns, Australia (2005), Minneapolis, MN (2006), Columbus, OH (2007), Mulhouse, France (2008), Sao Jose dos Campos, Brazil (2009), Valencia, Spain (2010), Dallas, TX (2011), Cracow, Poland (2012), New Delhi, India (2012), Skiathos, Greece (2013), Raleigh, NC (2014), Frascati, Italy (2015), Lisbon, Portugal (2016), and Mumbai, India (2017).

To maximize the exposure of Jefferson Lab physics to the Light Cone community, we request \$6,000 from the JSA Initiatives Fund to provide support for up to 10 junior scientists (students and postdocs) to cover the registration fees and/or travel costs to the Light Cone 2018 conference. The support will be in the form of the McCartor fellowships, which are awarded competitively by the International Light Cone Advisory Committee (ILCAC, <http://www.ilcacinc.org>) to promising young researchers. The awards will be presented to the recipients at a ceremony during the Light Cone 2018 conference.

II. GENERAL PRESENTATION

Light Cone dynamics is a theoretical framework capable of describing relativistic bound state systems, such as hadrons and nuclei, and their interactions, starting from the fundamental theory of nuclear physics, QCD. The overall goal of this framework is to provide a *bottom-up* understanding and prediction of low-energy nuclear physics. This serves as a complimentary approach to the now well-established lattice gauge theories in several ways. Most importantly, it is a natural and *computationally inexpensive* framework for accessing physical properties of hadrons which are sensitive to the Minkowski nature of spacetime, something that is notoriously challenging to obtain using lattice gauge theories.

III. SCIENTIFIC BACKGROUND

The scientific aim of the Light Cone conference series is to continuously update knowledge in light-front field theory, its phenomenological applications, and its connection to other frameworks. As mentioned above, light-front field theory provides a suitable framework for the calculations of variety of hadronic properties, including decay rates, scattering amplitudes, correlations, spin effects, and parton distributions. The experimental efforts, carried out at many accelerator facilities worldwide, represent a driving force for pursuing this goal. This will also be reflected in the composition of the International Advisory Committee (IAC), which will comprise both experimentalists and theorists. Part of the program will be also devoted to the discussion of applications to few-body systems, in both nuclear and electromagnetic environments, as well as the possible benefits from the interplay with other techniques. All of these facets are reflected in the lists of physics topics and tools presented above.

IV. SCIENTIFIC/EDUCATIONAL/TECHNICAL/BUSINESS MERITS

The LC2018 Local Organizing Committee (LOC) is comprised of JLab employees and users who are actively participating in research closely tied to the 12 GeV program and the future EIC. Jefferson Lab is a world class facility for hadronic physics, which partly stems from the close ties between the theorists, phenomenologists and experimentalists. This workshop aims towards further strengthening these ties and incentivize continuing collaboration amongst these subfields. The scientific program will include (i) *invited plenary talks*, which will highlight the most important developments of each subfield, (ii) *parallel talks*, which will cover detailed high-impact research, and (iii) *posters*, which will showcase students' work as well as preliminary results.

The IAC and ILCAC are formed by outstanding physicists in the field and will guarantee a high level of invited speakers and conveners. The conference will provide an important opportunity for junior scientists to showcase their work in an international arena, as well as to gain further understanding of some of the cutting-edge concepts currently being developed. The requested JSA funds will be used to provide support (registration fee waivers and/or travel support) to promising junior researchers (students or junior postdocs), in the form of the McCartor fellowships. These are judged competitively by the International Light Cone Advisory Committee (ILCAC, <http://www.ilcacinc.org>), with the awards presented to the recipients at a ceremony during the Light Cone 2018 conference.

V. BUDGET JUSTIFICATION

To maximize attendance at the conference by students and young postdocs, we will aim to provide (full or partial) registration fee waivers to as many young researchers as possible. In addition, we hope to be able to provide assistance to participants from developing countries. This will be possible if we are able to maintain an affordable registration fee for other attendees, which we estimate to be in the vicinity of \$350, for a total of between 70 and 80 participants. To achieve this goal we will make use of JLab as the host institution of the conference, which will provide savings in facility rental and support services. JLab has already committed \$5,000 in support of the conference, and we have obtained further commitments from Old Dominion University (for \$2,500) and Argonne National Laboratory (for \$2,000) for conference support, making a total of \$9,500 in leveraged support.

For the student support, we request **\$6,000** to cover **two** full McCartor awards (at \approx \$2,000 each), and up to an additional **eight** registration fee waivers for students and young postdocs (which we estimate will be \approx \$250 each).

VI. EVALUATION PLAN

The IAC and ILCAC will be responsible for scrutinizing both the program and the organization of the conference. The support of JSA will be officially recognized on the ILCAC web page (<http://www.ilcacinc.org>), under the link to McCartor Fellowships, as well on the web page of the conference, where we intend to include the logo of JSA among the sponsors of the conference, with a link to the JSA site. The scientific output of the conference and the activities that will take place thanks to the sponsorship of JSA will be summarized in a final report, which will be sent to JSA.



Dr. Jianwei Qiu
*Associate Director for Theoretical
and Computational Physics,
and Theory Center Director*
August 9, 2017

FY2018 JSA Initiatives Fund Program

Re: Support for the 27th International “Light Cone 2018 Conference” to be taken place at JLab on May 14-18, 2018

The proposal titled “Light Cone 2018 Conference”, by my colleagues Wally Melnitchouk *et al.*, applies for FY2018 JSA Initiatives Fund in order to provide critical financial support to enable good and active young researchers to attend and speak at the 27th International “Light Cone 2018 Conference” to be held at JLab on May 14-18, 2018.

The “Light Cone Conference” is a well-known and successful international conference series for QCD and hadron physics. It has brought and continues to bring scientists around the world together annually to exchange ideas, progresses, and discoveries with the goal of finding a rigorous description of hadrons and nuclei from the first principles of QCD, and is known, especially, for encouraging and supporting young researchers to participate in and speak at the conference. With the completion of JLab12 upgrade and the expectation of new and precise data becoming available soon, and a very strong proposal from my colleagues at JLab Theory Center, led by Dr. Wally Melnitchouk, Jefferson Lab was selected by the International Light Cone Advisory Committee to host the “Light Cone 2018 Conference (the 27th in the series)”.

The award to JLab to host the 27th International Light Cone 2018 Conference clearly reflects a strong international support to JLab12 program. Having the Conference taken place at JLab provides a tremendous opportunity to not only bring many scientists, from internationally renowned seniors to very active young postdocs and students, and new ideas and excitements to JLab, but also for JLab to show to the international community the new and unique capability of the upgraded CEBAF facility to contribute to the QCD and hadron physics.

As an Associate Director for Theoretical and Computational Physics at JLab, and the Director of its Theory Center, I value the importance of bring this Conference to JLab and I would like to offer my full and unconditional support to this proposal and its application for the FY2018 JSA Initiatives Fund to help bring more active young researchers to this international event and the JLab. Please feel free to contact me should you need more information or have any questions.

Sincerely yours,

Jianwei Qiu
Email: jquiu@jlab.org