I. Introduction and Background

The QCD Evolution workshop series started in 2011 with a two-day workshop held at Jefferson Lab. This workshop addressed the theoretical underpinnings of generalized parton distributions (GPDs) and transverse momentum distributions (TMDs), with a particular focus on the QCD evolution of the non-collinear TMDs. Since this initial meeting the workshop has broadened its scope considerably and grown significantly, and is now widely recognized as a leading hadron physics meeting in the field of hadron tomography. This workshop plays a key role in continuing to develop the theoretical basis for the quark and gluon tomography of hadrons, which is critical to the success of the nucleon tomography program at Jefferson Lab in the 12 GeV era. The QCD Evolution workshop series also plays an important role in the continual development of the science case for an electron-ion collider (EIC), and is also of relevance to key experiments at the Relativistic Heavy Ion Collider, Fermilab, and the Large Hadron Collider.

The previous QCD Evolution workshops were:

- 8–9 April 2011, Jefferson Lab, Newport News, VA
At the 2019 QCD Evolution workshop it was decided that the two forthcoming workshops will be held at:

- May 2020, UCLA, Los Angeles, CA
- May 2021, UVA, Charlottesville, VA

From its inception the QCD Evolution workshop series has paid particular attention to providing a forum for early career scientists to present their research and ideas to an audience consisting of their peers, as well as leading experts in the field. As this report will show, the 2019 workshop continued this tradition.

II. Organization

The workshop took place on 13–17 May 2019 in the Physics Division at Argonne National Laboratory. The local organizing committee was:

- Whitney Armstrong
- Kyle Bednar
- Debbie Beres (Workshop Coordinator)
- Ian Cloët (Chair)
- Adam Freese
- Sylvester Joosten
- Zein-Eddine Meziani
- Chao Shi
- Andrea Signori
- Zhihong Ye

and the advisory/organizing committee was

- Ian Balitsky, Jefferson Lab & ODU
III. Budget

The QCD Evolution 2019 workshop had four sources of funding:

- $3,000 from the JSA Initiatives Fund Program
- $4,000 from Jefferson Lab
- $1,000 from Temple University
- $9,000 from Argonne National Laboratory

The $3,000 from JSA was used to provide $500 each in travel support (e.g., accommodation, per-diem, airport transfers, and car rental) to 3 students and 3 postdocs. The $4,000 from Jefferson Lab was used to provide $500 each in travel support to 4 postdocs and 4 professor-level participants. A list of supported participants is given in Tab. 1. All student and postdoc participants received support, and all professor-level participants who requested support received support.

The $1,000 from Temple University was used to partly fund the workshop welcome reception on the evening of Monday 13 May 2019. The rest of the welcome reception was funded from the $9,000 from Argonne, in addition these funds covered the excursion bus to and from downtown Chicago, subsidized the workshop dinner, subsidized the coffee breaks, and provided $500 of support for local expenses for 7 professor-level participants.

The registration fee was $100 and the workshop dinner was $55 per-person.

IV. Summary

The workshop had 56 participants almost all of whom gave a 30 min presentation. There were no parallel sessions. In addition to the talks we had a lively discussion session at the end of each day, which were chaired by: Tue – Cedric Lorce, Piet Mulders; Wed – Yuri Kovchegov, Andrea Signori; Thu – Simonetta Liuti, Asmita Mukherjee; and Fri – Ian Cloët. Further details of the agenda and copies of the talks can be found on the workshop agenda web page https://www.phy.anl.gov/qcd2019/agenda.php.

In my view this workshop was a great success, with the funds from JSA and Jefferson Lab being critical to this. This workshop contributed positively to the Jefferson Lab 12 GeV program and the science case for a U.S.-Based EIC. There continues to be a strong need for workshops like this that can help refine and develop the science case associated with quark/gluon tomography, and articulate how Jefferson Lab
Table 1: Travel support given to participants of the QCD Evolution 2019 workshop. In summary we provided $5500 in travel support to professor level participants, $3500 in travel support to postdocs, and $1500 travel support to students. All students and postdocs received support, and all professors that requested support were given support.

Can help deliver this science, both in the 12 GeV era and beyond with an EIC. In this context QCD Evolution 2019 came at an opportune time. On behalf of all the organizers and participants we thank JSA for their significant support for this workshop. To provide a small flavor of the workshop, appended below is one of the workshop whiteboards after an afternoon discussion.