JSA Jefferson Science Associates

Thomas Jefferson National Accelerator Facility

November 20, 2017

Office of Nuclear Physics
SC-26/Germantown Building
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585-1290

Dear Dr. Rai:

I am writing to you to lend my support to the proposal by Dr.
G.P.Gilfoyle to fund a Masters student as part of a joint University of
Richmond/University of Surrey program that has been successful since
2013. The proposal is part of the renewal application in Medium Energy
Nuclear Physics entitled ``Nuclear Physics at the University of
Richmond'' (G.P.Gilfoyle, PI) which is focused exclusively on the
scientific program at Jefferson Lab. I am a scientific staff member at
Jefferson Lab (JLab) in Hall B and was part of the CLAS12 software group
when this Richmond/Surrey program at JLab was started. I am now leader of
the CLAS12 software group.

The University of Surrey in the UK has a large undergraduate program that
students typically complete in three years and receive the equivalent of
a bachelor's degree in the US. The best undergraduate physics majors at
Surrey are encouraged to apply to the Masters of Physics (M.Phys) program
to receive a Masters degree in addition to their bachelors after one
additional year of study. The essential part of the M.Phys is a research
year where students spend ten months working in a laboratory and writing
a thesis based on their work. Students participating in this program are
at a level roughly equivalent to an advanced undergraduate or a new
graduate student in the US. After their research year they defend their
thesis before a committee during their final semester at Surrey.

Since 2013 three Surrey masters students have been supported by Dr.
Gilfoyle's DOE grant. In each case Dr. Gilfoyle was the official mentor,
but all three were part of the software group and engaged with
physicists, engineers, and technicians in the CLAS Collaboration and
throughout Jefferson Lab. In each case Dr. Gilfoyle and I coordinated the
Surrey students' projects with the priorities of the Software Group and
in particular on preparations for the arrival of beam in CLAS12. Mr. Alex
Colvill's M.Phys thesis (2013) was on the development of the stand-alone
reconstruction software for the time-of-flight (TOF) subsystems in
CLAS12. He adapted the existing Fortran-based algorithms from the
previous detector in Hall B to our new service-based architecture using
the Java language. He received first honors for his thesis and it was

adapted to a CLAS Collaboration technical report (CLAS12-NOTE 2014-013).
Mr. Peter Davies' work (2016) was on the geometry model and software
tools for the Silicon Vertex Tracker (SVT) in CLAS12. His project started
with an early set of the core parameters and the relationships among them
for the SVT and he developed the tools to produce the inputs needed for
the CLAS12, physics-based simulation and the methods needed for the SVT
reconstruction code. He was able to resolve differences between the early
set of geometry parameters and the current design of the SVT by working
with the JLab designers. He has completed the Surrey masters program and
his M.Phys thesis has also been published as a CLAS-NOTE (CLAS12-NOTE
2017-008). Mr. Charles Platt's project (2017) is testing and validating
the SVT geometry code and integrating it into the SVT reconstruction
algorithms. That work is still going on.

The Richmond/Surrey program is an excellent source of scientific talent.
The students have a strong physics education (better than most US
students at liberal arts institutions like Richmond) so they quickly
climb the learning curve. The research year lasts long enough to complete
a substantial project. It is worth noting that support for capable
students like these are an efficient use of resources.

To conclude, I would like to restate my support for Dr. Gilfoyle's
proposal to continue supporting a Surrey M.Phys student. This program
taps a useful source of scientific talent that makes efficient use of our
resources in preparing for data taking in CLAS12.

                              Sincerely,

                              Dr. Veronique Ziegler
                              Staff Scientist
                              Jefferson Science Associates