DATE: May 13, 2015

TO: Randall Hannum , Chair of College Council Curriculum Committee

FROM: Curriculum Subcommittee

Henry Africk (Chair), Stephanie Boyle and Yu Wang

RE: Final Report for Proposal 15–10: Bachelor of Science Degree in Applied Computational

Physics

PROPOSAL OVERVIEW:

The Department of Physics proposes a Bachelor of Science degree program in Applied Computational Physics. This program would be a synthesis of applied physics and high-performance computing. It will provide students with strong technical skills, critical thinking, and problem-solving abilities that are highly rated by companies in their hiring process. Graduates of the program will be equipped with a solid foundation in physics, computing, and mathematics. The program will provide pathways for employment after graduation, as well as for admission to graduate programs.

RATIONALE:

An Applied Computational Physics degree program will provide a more broad, balanced and flexible education than a traditional physics major. Presenting physics within a scientific problem-solving paradigm is a more effective and efficient way to teach physics than the more traditional route. The program will help fulfill the growing need for researchers, educators, and information professionals who will perform in roles requiring both programming and problem-solving skills, as well as technological and computational proficiency. The program will prepare students for careers not just in physics, but in areas such as aerospace, applied mathematics, computer science, physical chemistry, finance, bio-medicine, environmental science. The proposed program would be unique in CUNY, in that none of the physics Bachelor’s programs at CUNY currently includes a computational physics component.

STRENGTHS:

The BS in Applied Computational Physics Chemistry will prepare students for careers in a wide range of areas requiring problem-solving skills, as well as technological and computational proficiency. This will better align the department’s degree offerings with the college’s core mission of training students for careers in applied science. A large and diverse choice of electives provides the flexibility for students to pursue a wide variety of career options. At the same time, the rigorous requirements of the program insures that graduates will achieve a high level of technical proficiency. The Department of Physics is well staffed and its laboratories are well equipped to support the academic needs of the program. The Curriculum Subcommittee finds this proposal to be thoroughly prepared and well documented.

CONCERNS:

The admission requirements to this program are substantial. Students need to be ready to take calculus and calculus-based physics in the very first semester. Students who are not ready will be required to take more than the 120 credits required for graduation. Also students who transfer into the college from other CUNY colleges may have already fulfilled their Pathways mathematics and science requirements with courses other than Calculus I and II and Physics I and II. They will need to go substantially beyond the 120 credits required to graduate. The number of students in the program is likely to be small. This might make it difficult to run some of the new advanced elective courses such as PHYS 3400 and PHYS 3500.

WEAKNESSESS:

None.

SUBCOMMITTEE ACTIVITIES:

The subcommittee met with the proposers on March 8, 2016. The subcommittee met with the proposers, Provost Bonne August, Associate Provost Pam Brown, Dean Justin Vazquez-Poritz and Kim Cardascia on April 4, 2016 . A substantial number of modifications were recommended and incorporated in the final document. An open hearing was held on May 10, 2016.