

## Intellectual Merit Criterion

### Overall Assessment of Intellectual Merit

Fair

### Explanation to Applicant

Intellectual Merit: The candidate's previous research has been in the area of "soft matter" and an associated packing problem. These occurred at their home institution. This initial research work was carried out with a former PhD student. The proposed research seems to offer a direct generalization of the work carried out in a recent article "MHM: A Multiple Handshaking MAC Protocol for Underwater Acoustic Sensor Networks" by W. Lin and K. Chen, that appeared in the International Journal of Distributed Sensor Networks, Volume 2016, Article ID 9798075, 12 pages, <http://dx.doi.org/10.1155/2016/9798075>. This work would continue collaboration with Chinese scholars. The application seems to suggest that this interest developed as part of an international REU activity. This research and proposed location would further some of the cross cultures interactions that the scholar learned to value as an undergraduate student.

## Broader Impacts Criterion

### Overall Assessment of Broader Impacts

Fair

### Explanation to Applicant

Broader Impact: The scholar values cross cultural activities and specifically mentioned his tour with RIPS-HK which seemed to provide a transformative set of experiences. The proposed research would be, if this reviewer understood correctly, would help understand differences between acoustic wave communications that are different from electromagnetic waves. According to a reviewer the signal processing studies produced promising results.

## Summary Comments

Summary: The letters of recommendations are strong and offers context for the applicant and note strong potential in both mathematics and physics/electrical engineering. The REU work seems to have been a formative aspect of the entire application process. Based on strong letters this reviewer agreed with positive letter writer that this prospect is likely to write a very good PhD thesis. However, at some level this proposal seemed to be incomplete in the sense that it does not make as compelling a case for the proposed research, as some other applications that this reviewer reviewed. While there are clearly broader impacts of the proposed research work, acoustic wave propagation in the ocean is mentioned, this reviewer found this research description somewhat incomplete, again, when compared to other applications that were reviewed. However, we do agree that this research has the potential to be very important. Ultimately, this reviewer found it unfortunate that this application was among the more incomplete that this reviewer was asked to review. While the letters of recommendation were positive, the fact that the application seemed to be missing parts of its narrative, when compared with other applications, made this application not competitive.

## Intellectual Merit Criterion

### Overall Assessment of Intellectual Merit

Very Good

### Explanation to Applicant

MAC for the Acoustic communication underwater, which involves computer science, electronic engineering, physics, etc.

## Broader Impacts Criterion

### Overall Assessment of Broader Impacts

Excellent

### Explanation to Applicant

wireless communication underwater; sino-us collaboration in academia

### Summary Comments

The background and preliminary work are not convincing enough. It is a more "computer science" proposal, while the applicant is a math and physics guy.

## Intellectual Merit Criterion

### Overall Assessment of Intellectual Merit

Good

### Explanation to Applicant

Tyler Chen has an excellent academic record during his undergrad career. He will graduate from Tufts University with BS in mathematical sciences with a GPA of 3.9/4.0, he worked on several research projects both through his REU and at Hongkong for a IPAM program. He has several awards. All three letters of recommendation are from professors who know him well and they are strongly supportive. He plans to attend graduate program to continue research in Multiple Handshaking MAC protocol for short range underwater mobile acoustic networks with NSF fellowship. It is as clear if the topics is of interest in a mathematics program

## Broader Impacts Criterion

### Overall Assessment of Broader Impacts

Fair

### Explanation to Applicant

The applicant had a very strong research experience and the mathematical work has some implication in telecommunication science. The applicant did not describe his effort in outreach activities during undergraduate.

### Summary Comments

The applicant has a strong academic record and has been actively engaged in a research project. He is very well qualified for the work he proposed to carry out in graduate school. The applicant is encouraged to enhance the broader impact plan and activities and also find an research area to make substantial mathematical contribution.