**Happening Now | September 07, 2018**

Prize Spotlight: Yiqiao Zhong

The 2018 SIAM Student Paper Prize was awarded to Yiqiao Zhong for his paper, "Near-Optimal Bounds for Phase Synchronization," co-authored with Nicolas Boumal of Princeton University and published in *SIAM Journal on Optimization* in 2018. Zhong received the award and presented his winning paper at the SIAM Annual Meeting, held July 9-13, 2018 in Portland, Oregon.
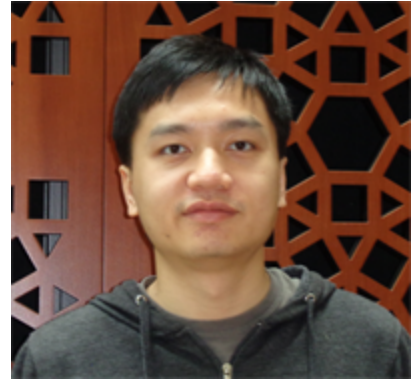
Yiqiao Zhong

The SIAM Student Paper Prize recognizes outstanding scholarship by students in applied mathematics and computing as evidenced in a paper accepted for publication in a SIAM journal. The SIAM Student Paper Prize is awarded annually to the student authors of the most outstanding papers accepted by a SIAM journal. The award is based solely on the merit and content of the candidate's contribution to the paper.

Yiqiao (Joe) Zhong is currently finishing his fourth year as a PhD student in the Department of Operations Research and Financial Engineering at Princeton University, under the supervision of Jianqing Fan. Zhong's research interest is a mix of statistics, optimization, and probability. In particular, he is interested in spectral methods, nonconvex optimization, and various estimation problems involving low-rank structures.

Q: *Why are you excited about winning the SIAM Student Paper Prize?*

A: I was very excited when I got the news about the prize. I attended the SIAM Annual Meeting last year, and I knew it was a great honor to receive prizes in the award ceremony. As a graduate student, I feel very fortunate to receive this award, and also feel very encouraged to do better research in my future career. I greatly appreciate the support I have received from my co-author Nicolas Boumal and my advisor Jianqing Fan.

Yiqiao Zhong (right) of Princeton University was awarded the SIAM Student Paper Prize from SIAM President Nick Higham (left) at the 2018 SIAM Annual Meeting.

Q: *Could you tell us a bit about the research that won you the prize?*

A: The research problem I have worked on, "phase synchronization," has gained much attention in the optimization and statistics communities recently. The goal is to recover (or estimate) many unknown phase angles simultaneously based on information from their pairwise differences. In practice, measurements are usually very noisy, so a fundamental problem is to understand how well we are able to estimate these angles, and what algorithms are good at doing the job efficiently. My research focuses on the analyses of two algorithms, which were observed to perform well but were not fully understood.

Q: *What does your research mean to the public?*

A: One important application of phase synchronization is imaging technology. For example, in cryo- electron microscopy (Cryo-EM), where biologists determine molecular structures from images, the rotations are unknown and we can use ideas from phase synchronization to estimate them from their pairwise comparisons. I hope my research can provide practitioners with new understanding of algorithms they are using every day and can lead to better methods for biologists and other scientists.

Q: *What does being a SIAM member mean to you?*

A: I greatly appreciate my SIAM membership. My research style has been influenced by many great people in this community, and I have been learning new things from various sources: conferences, journals, newsletters, etc. SIAM has brought researchers from different backgrounds together, including applied mathematicians, statisticians, data scientists, etc. It's great to talk and learn from different people.