

155 Bay State Road
Boston, MA 02215

August 20, 2013

Dr. David P. Williamson
School of Operations Research and Industrial Engineering
Cornell University
236 Rhodes Hall
Ithaca, NY 14853

Dear Dr. David P. Williamson,

Attached is the manuscript “Motors and Impossible Firing Patterns in the Parallel Chip-Firing Game”, by Tian-Yi Jiang, Ziv Scully, and Yan X Zhang, which we are submitting for consideration for publication in the *SIAM Journal on Discrete Mathematics*. This submission is exclusive. A preprint of the manuscript is available on arXiv; the manuscript has not been released in any other form.

The paper shifts the scope of known periodic behavior in the parallel chip-firing game, a discrete automaton on graphs, by both introducing a new constructive tool and proving certain periodic patterns impossible. The paper is of interest in mathematics, where the parallel chip-firing game has numerous connections to graph theory, and in physics, where our results may have implications for the parallel chip-firing game (in physics, also known as the discrete fixed-energy sandpile) viewed as a dynamical system.

Please address correspondence regarding this manuscript to my address above or to my email, ziv@mit.edu. Thank you for your consideration!

Sincerely,

Ziv Scully