Abstract Submitted
for the SES16 Meeting of
The American Physical Society

Optimized simulations of Olami-Feder-Christensen systems using parallel algorithms[1] ERIC MONTAG, RACHELE DOMINGUEZ, RANCE NECAISE, Randolph-Macon College — The sequential nature of the Olami-Feder-Christensen (OFC) model for earthquake simulations limits the benefits of parallel computing approaches because of the frequent communication required between processors. We developed a parallel version of the OFC algorithm for multi-core processors. Our data, even for relatively small system sizes and low numbers of processors, indicates that increasing the number of processors provides significantly faster simulations; producing more efficient results than previous attempts that used network-based Beowulf clusters. Our algorithm optimizes performance by exploiting the multi-core processor architecture, minimizing communication time in contrast to the networked Beowulf-cluster approaches. Our multi-core algorithm is the basis for a new algorithm using GPUs that will drastically increase the number of processors available. Previous studies incorporating realistic structural features of faults into OFC models have revealed spatial and temporal patterns observed in real earthquake systems. The computational advances presented here will allow for studying interacting networks of faults, rather than individual faults, further enhancing our understanding of the relationship between the earth's structure and the triggering process.

[1]This research was funded by the Schapiro Undergraduate Research Foundation, the Craigie Teaching Endowment, the Chenery Research Grant, and the Rashkind Family Endowment.

Eric Montag
Randolph-Macon College

Date submitted: 05 Oct 2016 Electronic form version 1.4