

Suzanne J. Matthews, Joel C. Adams, Richard A. Brown, and Elizabeth Shoop. 2019. Exploring Parallel Computing with OpenMP on the Raspberry Pi. In Proceedings of the 50th ACM Technical Symposium on Computer Science Education (SIGCSE '19). Association for Computing Machinery, New York, NY, USA, 1234. DOI:<https://doi.org/10.1145/3287324.3287535>

The ACM/IEEE CS 2013 report recommends fifteen hours of parallel & distributed computing (PDC) education for every undergraduate. This workshop illustrates the use of the Raspberry Pi as an inexpensive, multicore platform for teaching shared-memory parallel programming. The inexpensive and tactile nature of the Raspberry Pi enables each student to experience her own parallel multiprocessor through sight and touch. In this hands-on workshop, we will teach attendees how they can leverage the Raspberry Pi and the OpenMP library to teach shared-memory parallel concepts in their own classrooms. All CS educators who are interested in learning about the Raspberry Pi, shared memory parallelism, and OpenMP are encouraged to attend. In Part I of the workshop, each participant will connect to and learn about the Raspberry Pi's multicore capabilities. In Part II, each participant will engage in self-paced, hands-on exploration of basic parallel computing concepts using the OpenMP "patternlets" from CSinParallel.org. In Part III, participants will investigate more complex applications, such as numeric integration and drug design and study how these applications can be parallelized using OpenMP. We will conclude the workshop with a series of lightning talks discussing how the Raspberry Pi has been used to teach parallel computing concepts at different institutions. We will also present a summary of student perceptions of the Raspberry Pi. All materials from this workshop will be freely available from CSinParallel.org. Space is limited to 20 participants. A laptop is required.