Title - The paper title should be typed in upper and lowercase letters, not all capital letters or all lowercase letters. (Example: This Is How the Paper Title Should Be Typed):

**Job Placement for Cooperative 3D Printing**

Abstract - Type your abstract or cut and paste the text from a word-processing file in the space provided below. Minimum of 100 words and a maximum of 650 words:

Cooperative 3D Printing (C3DP), a hybrid additive manufacturing platform consisting of a swarm of mobile printing robots, is an emerging technology designed to address the size and printing speed limitations of conventional gantry-based 3D printers. A typical C3DP process often involves several interconnected stages, including job partitioning, job placement, task scheduling, path planning, and motion planning. In our previous work on job partitioning, we presented a Vertical Chunker, which divides a tall print job into multiple chunks to overcome the physical constraints of printers in the Z direction, and an XY Chunker, to partition jobs into discrete sections that are allocated to individual printing robots for parallel printing. These geometry partitioning algorithms determine what is to be printed, but other information, such as when, where, and in what order chunks should be printed, is required to carry out the print physically. Previous studies have investigated manufacturing scheduling (i.e., to find the optimal print sequence) and path planning (i.e., to compute collision-free paths for mobile printers) in C3DP for both single-job and multi-job prints. However, these studies have, until now, always assumed an arbitrary job placement. For single-job prints, arbitrary placement is appropriate as it only influences the time for the mobile printer to move from its home position to the first chunk. However, when multiple jobs are present, for example, when applying the Vertical Chunker to generate multiple jobs from the Z direction, the placement of these jobs on the XY plane impacts both printability and makespan. This paper introduces the first Job Placement Optimizer for C3DP based on Dynamic Dependency List schedule assignment and Conflict-Based Search path planning. Our algorithm determines the optimal locations for all jobs and chunks (i.e., subtasks of a job) on the factory floor to have the least makespan for C3DP. To validate the proposed approach, we conduct two case studies, one for simple geometry and the other one for complex geometry. We also perform experiments to understand the impact of other factors, such as the number of robots, the number of jobs, and the heterogeneity of prints (e.g., when chunks are different in size and materials), on the effectiveness of this placement optimizer.

Paper - Length No more than 10 pages (fully formatted, two-column, 8.5 x 11 in. pages)