

## Patternlets and TSGL: CSinParallel Tools for Visualizing Parallel Behavior.

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### Abstract

Parallel and distributed computing (PDC) is now in the core CS curriculum, and every CS student needs to learn about PDC. **CSinParallel** is an NSF funded project to provide modular pedagogical materials, tools, and faculty development workshops for PDC. One of our tools is *patternlets*, a collection of self-paced, minimalist, text-based, scalable parallel programming exercises. Another of our tools is *TSGL*, a thread-safe graphics library that can be used with OpenMP, C++11, and/or POSIX threads. Using TSGL, an educator (or student) can annotate a multithreaded computation with graphics calls that show precisely what each thread is contributing to the computation as the program is running, in near real-time. This presentation includes an overview of the CSinParallel project, plus "live" demonstrations of patternlets and TSGL visualizations that illustrate different ways of visualizing parallel behavior.

### Resources:

- *CSinParallel*: <http://csinparallel.org>
- *Patternlets*:
  - Collection: <https://github.com/joeladams/patternlets>
  - Module: <http://serc.carleton.edu/csinparallel/modules/patternlets.html>
- *TSGL*:
  - Collection: <https://github.com/Calvin-CS/TSGL>
  - Module: Coming this summer!