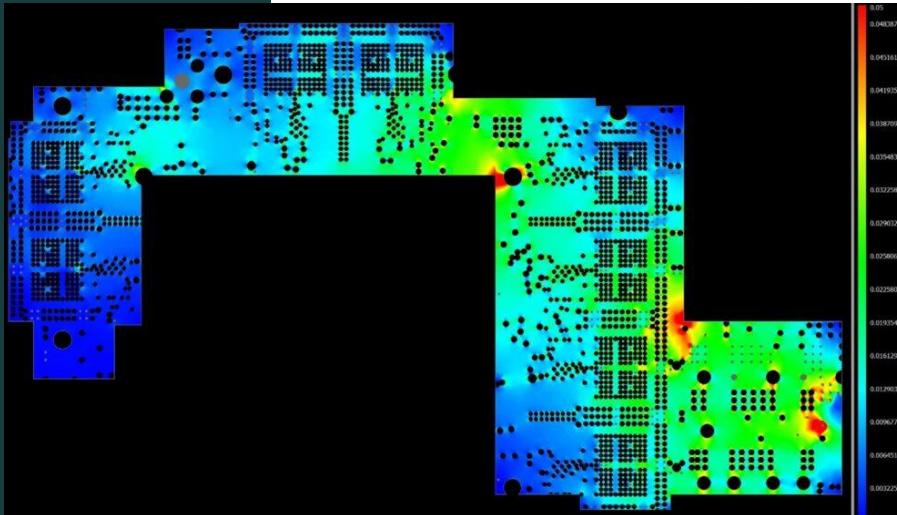
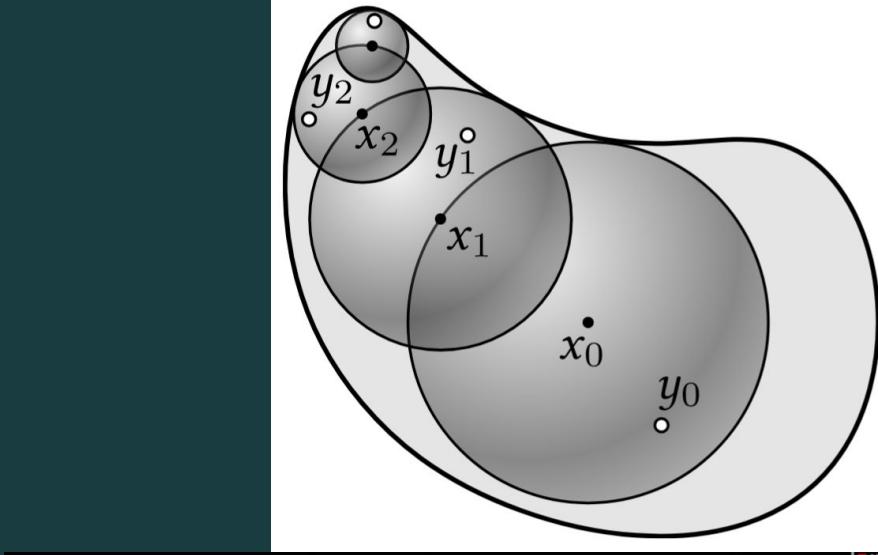


Lewis Ghrist, Hongyi (Johnny) Ding, Oliver Hendrych
11/12/2025

Walking on Spheres and Stars for Interactive PCB Simulation

Milestone 1 Presentation



Process

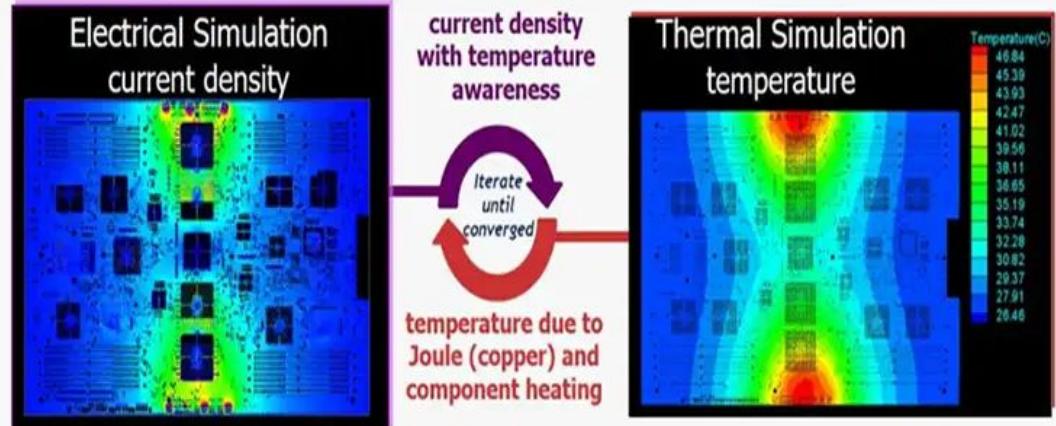
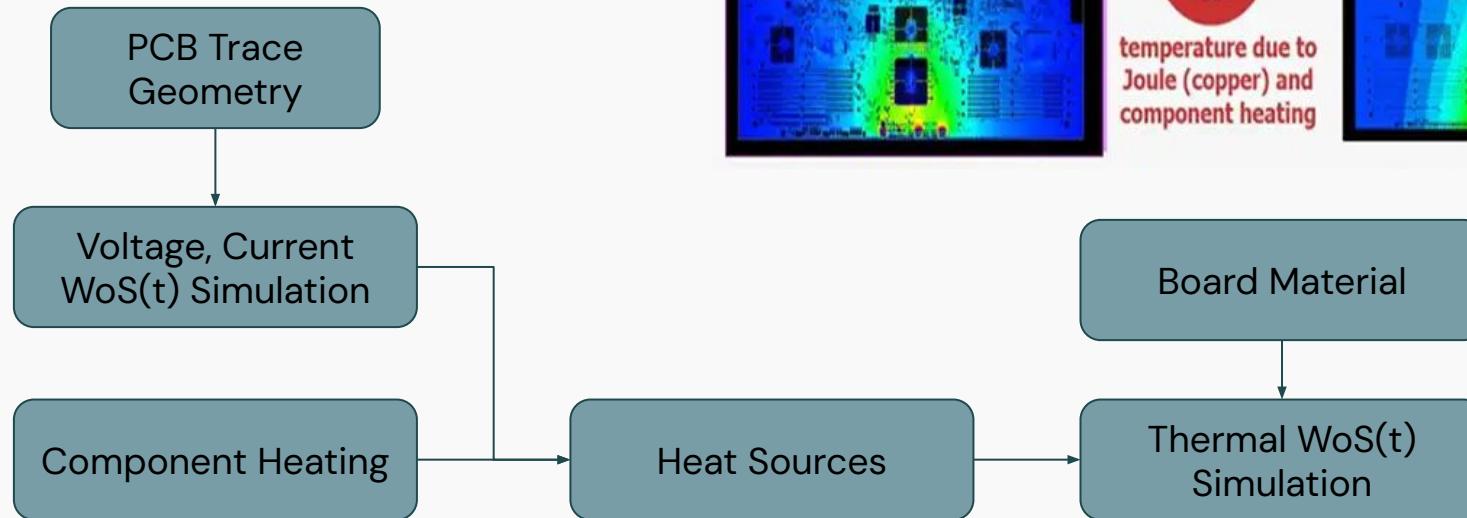
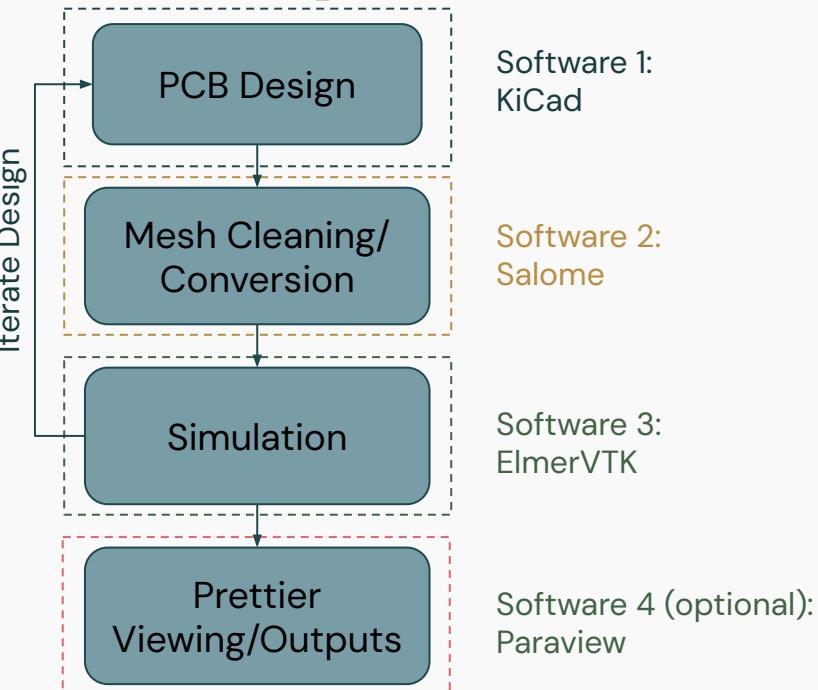


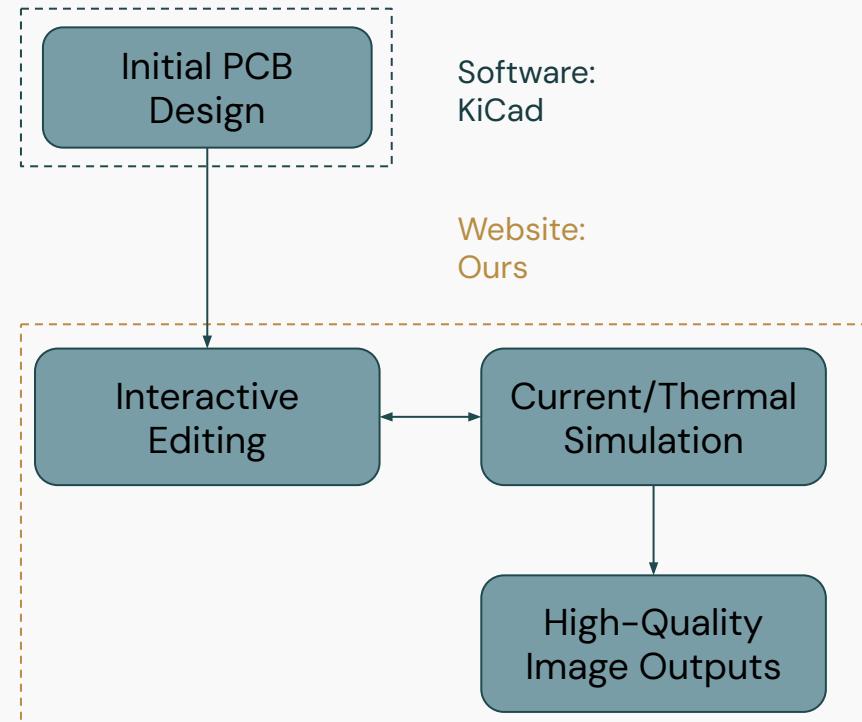
image from: <https://www.jarnistech.com/pcb-design-tips/thermal-simulation>

Workflow

Current Open Source:



Ours (Planned):



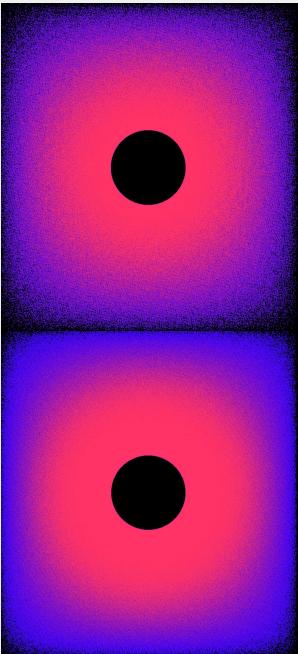
source:<https://jrainimo.com/build/2024/1/oss-thermal-simulation-of-pcb/>

Current Progress

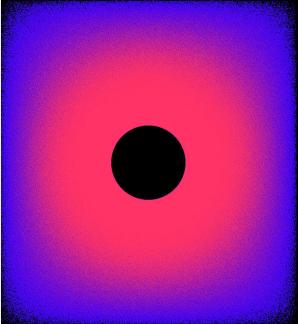
Walk On Spheres

Number Of Walks

5 Walks Per Point

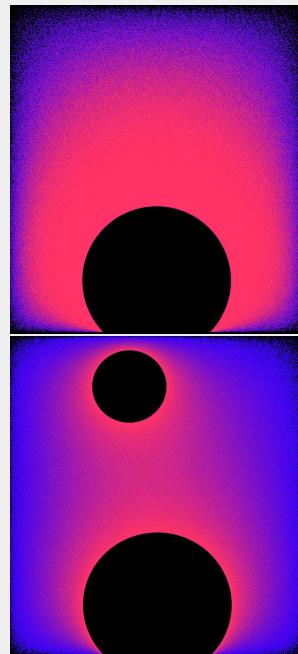


20 Walks Per Point



Boundaries

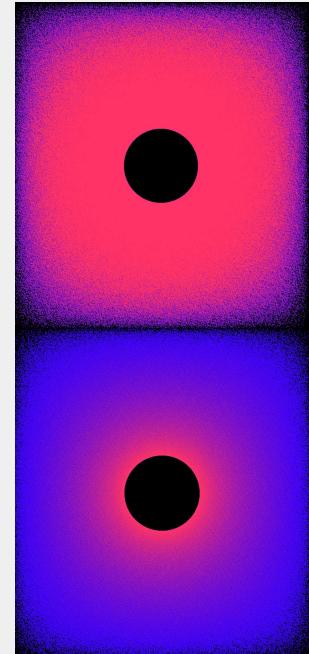
Varying Sizes



Multiple Boundaries

Boundary Values

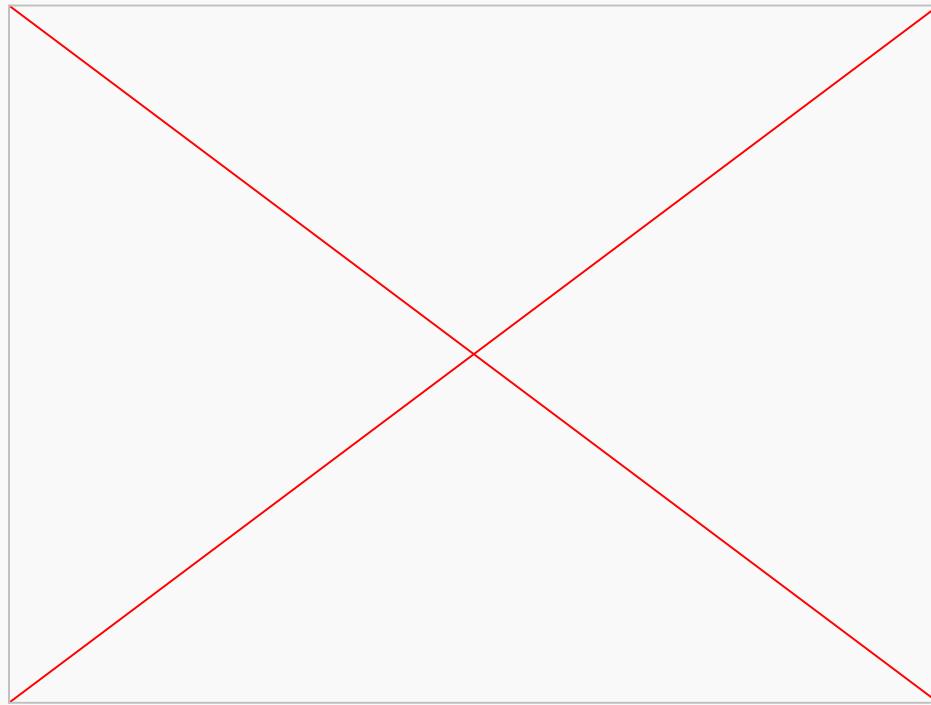
Temperature = 15



Temperature = 1

Current Progress

Interactive Editing

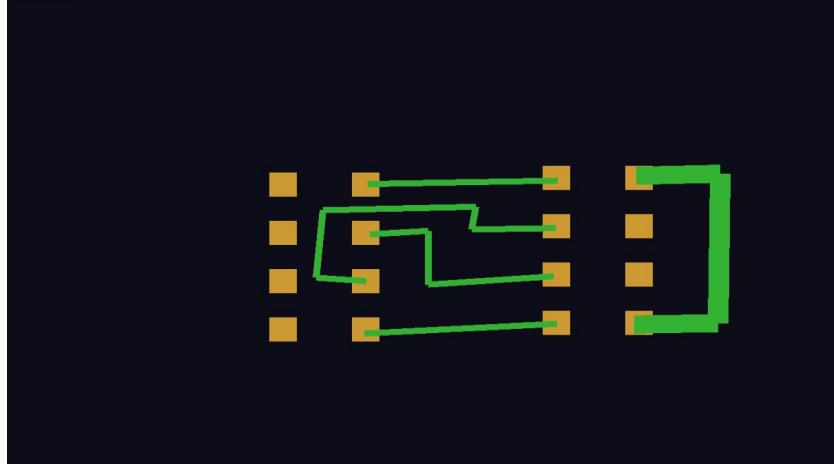


Online Editor

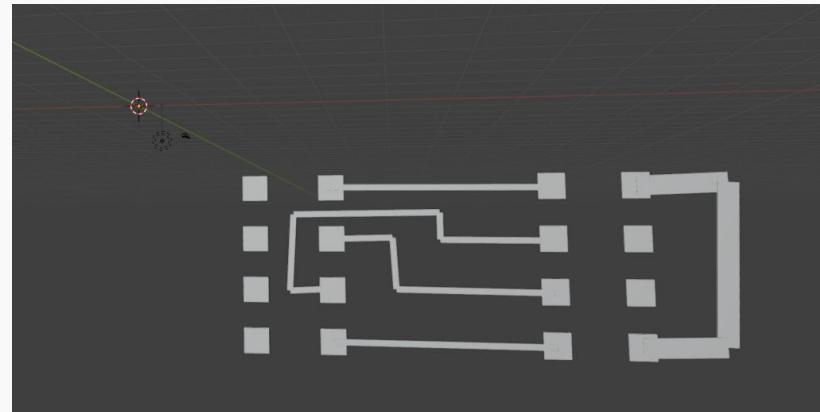
Place DIP-8 Draw Trace Trace Width: 3

Click to place/add points. Press 'Esc' to finish drawing a trace.

Export to OBJ



Export to OBJ (viewed in Blender)



Next Milestone

- WoS(t)
 - Walk on Stars
 - Pipeline optimizations (wavefront walks, stream compaction, AA?)
- Editor
 - Layer Stackup
 - Importing KiCad Boards
 - Assigning boundary conditions
- Overlaying WoS(t) on PCB editor

References

- <http://www.rohansawhney.io/mcgp.pdf>
- <https://www.jarnistech.com/pcb-design-tips/thermal-simulation>
- <https://jrainimo.com/build/2024/11/oss-thermal-simulation-of-pcb/>
- <https://www.ema-eda.com/ema-resources/customer-story/advanced-layout-solutions-achieves-breakthrough-performance/>