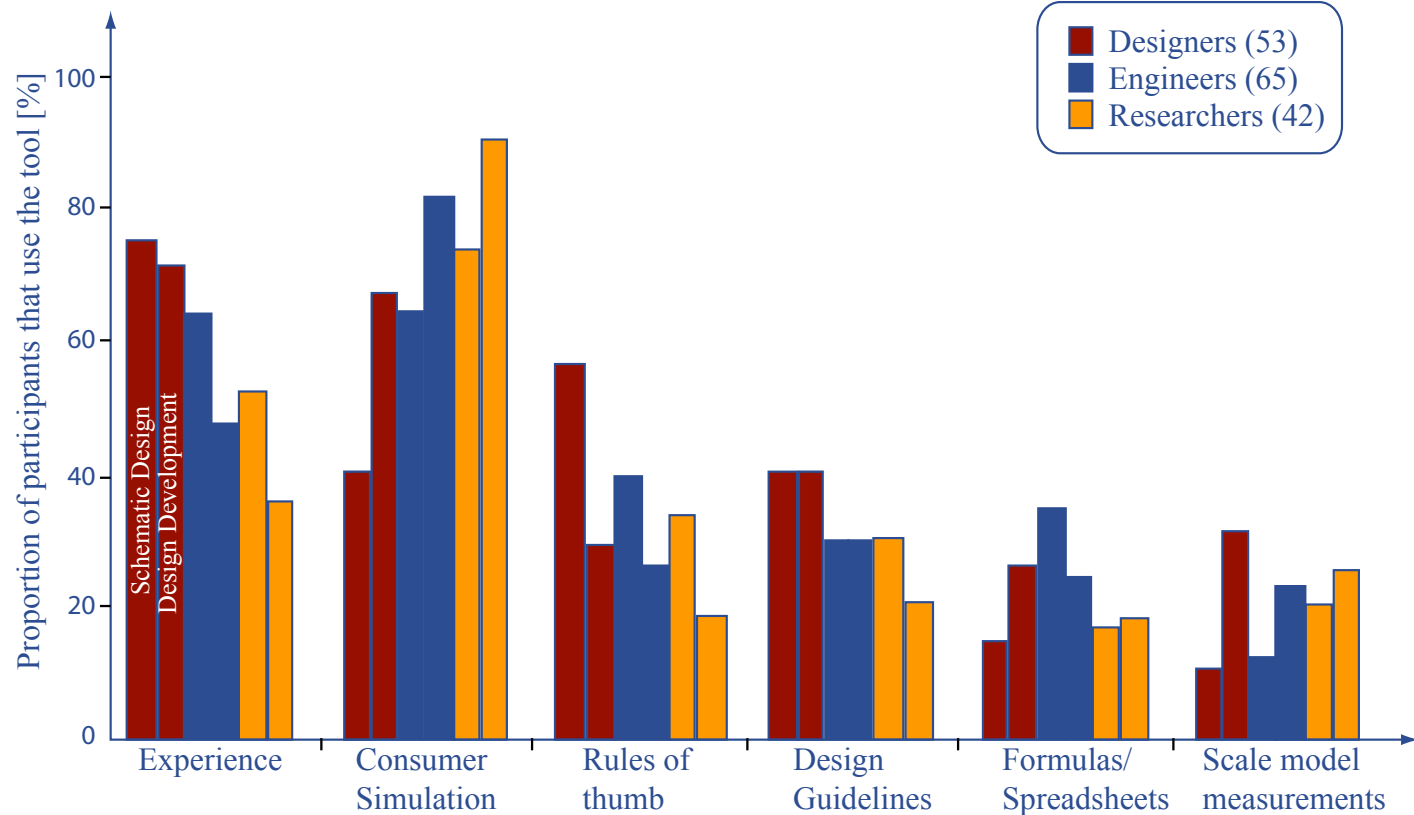


Advanced Simulation Tools

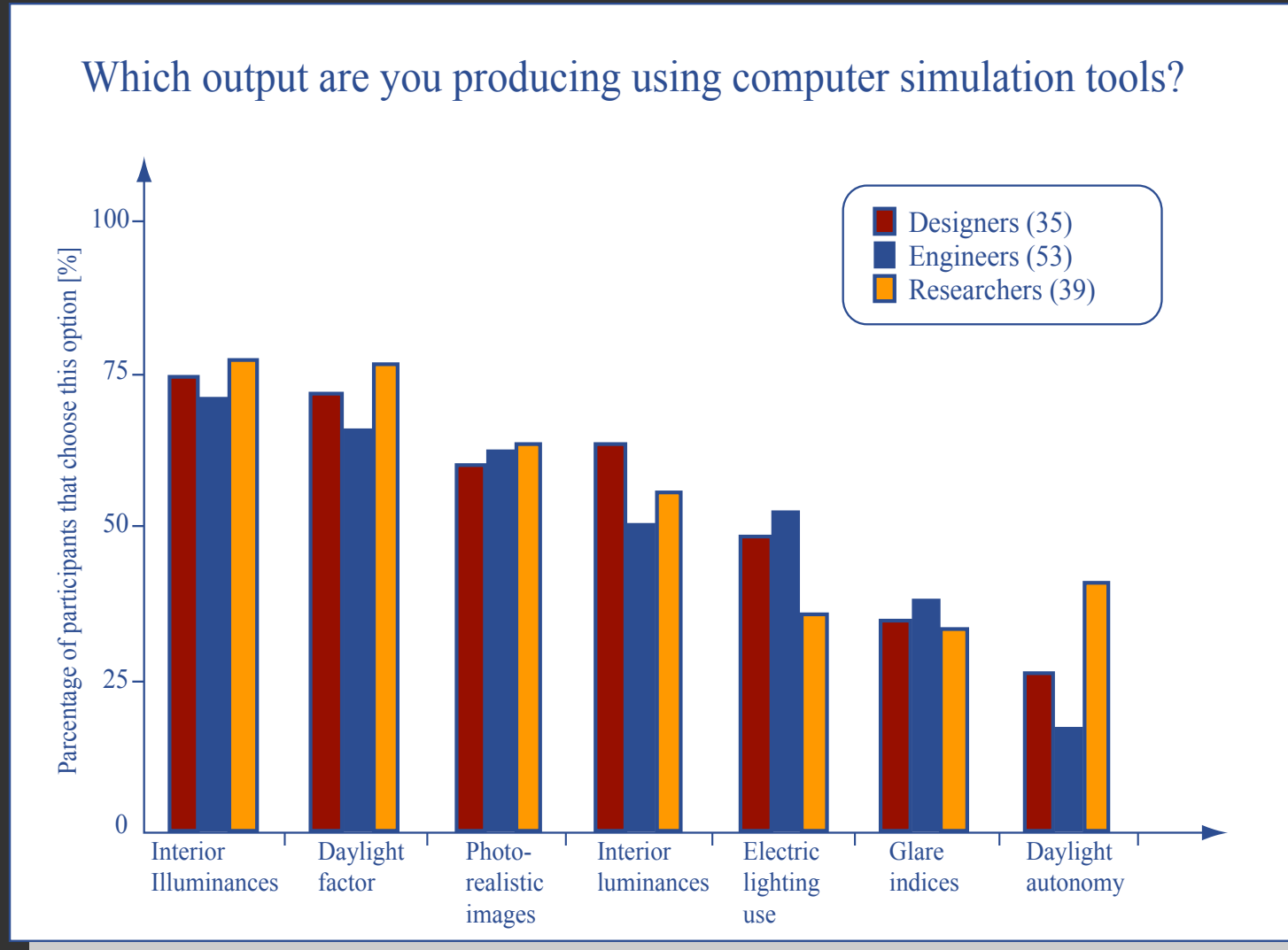
► Survey on daylighting simulation methods

What kind of daylight prediction tools do you use to estimate or calculate daylighting during (a) schematic design (b) design development?



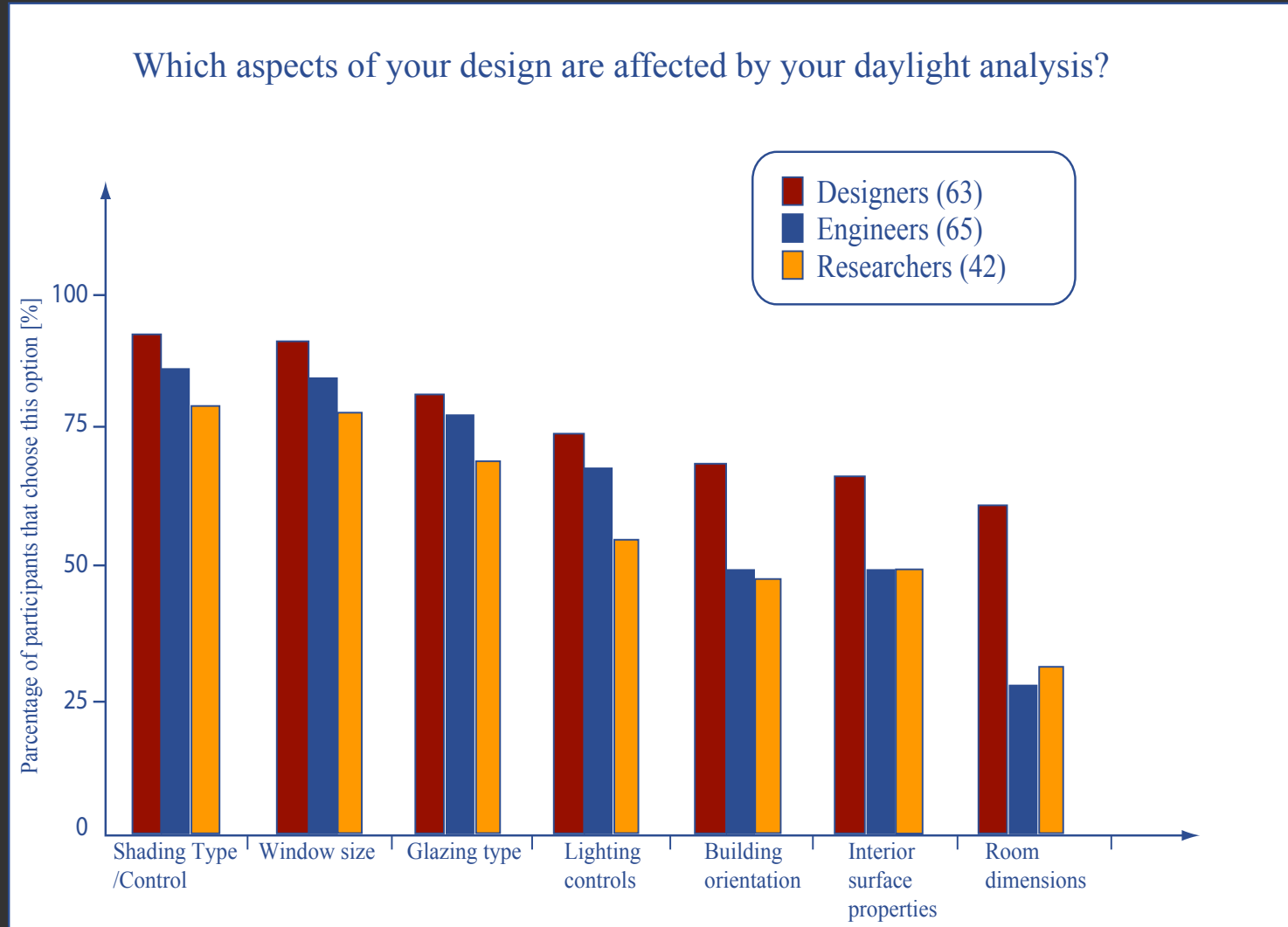
Advanced Simulation Tools

► Survey on daylighting simulation methods



Advanced Simulation Tools

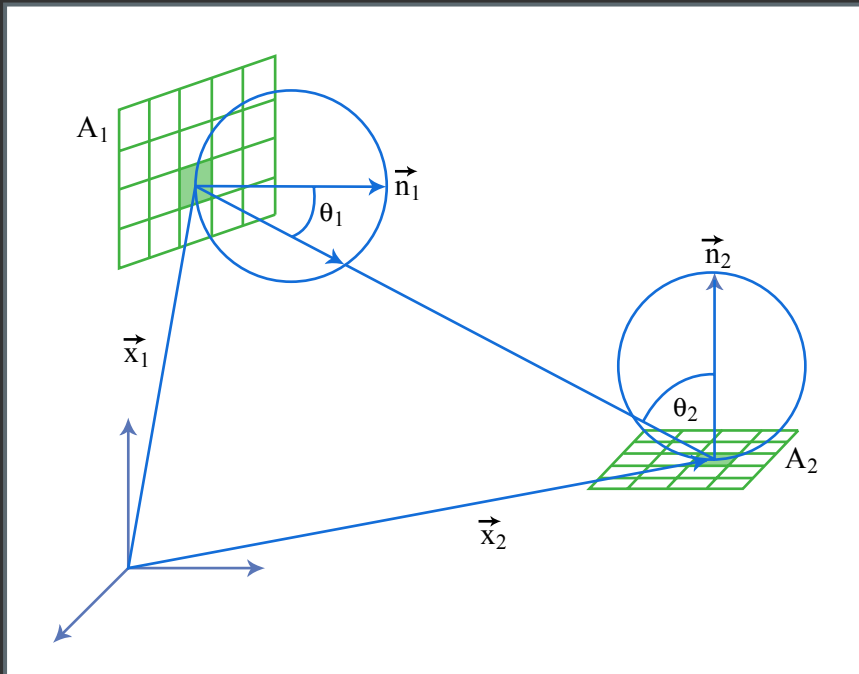
► Survey on daylighting simulation methods



Advanced Simulation Tools

► Radiosity method

- luminous energy exchange between surfaces
- diffuse surfaces only
- Lightscape, AGI32: radiosity combined with direct shadows



SUPERLITE

Figure by MIT OCW.

Advanced Simulation Tools

▶ Ray-tracing methods: Forwards

FORWARD
(complex reflections)

- TracePro

Advanced Simulation Tools

▶ Ray-tracing methods: Backwards

BACKWARDS
(photo-realistic images)

■ Radiance

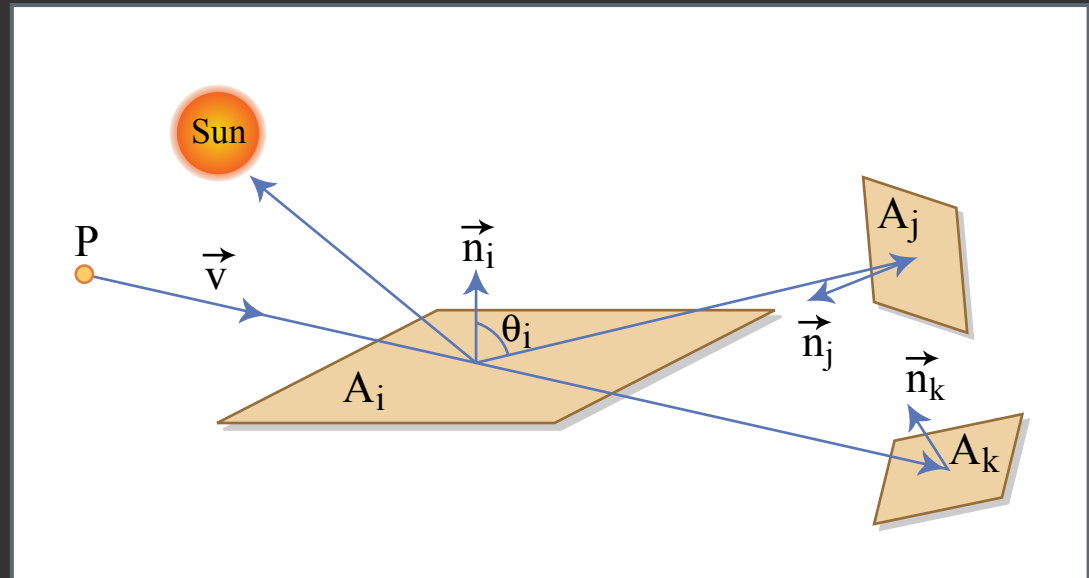


Figure by MIT OCW.

ECOTEECT – DAYSIM – RADIANCE “package”

ECOTEECT

Daylight autonomy



Daylight Factor
Illuminance



RCP

Daylight factor



DAYSIM

Lighting energy

ECOTEECT

Visualization

RADIANCE

Screenshots removed due to copyright restrictions.

Advanced Simulation Tools

▶ Sketchup

Screenshot removed due to copyright restrictions.

Advanced Simulation Tools

▶ The "LightSolve" project

- filling the gap between existing daylighting tools
- main innovations
 - highly visual and interactive but early stages of design
 - synthetic representation of dynamic nature of daylight
 - goal-driven approach

Advanced Simulation Tools

▶ The "LightSolve" project

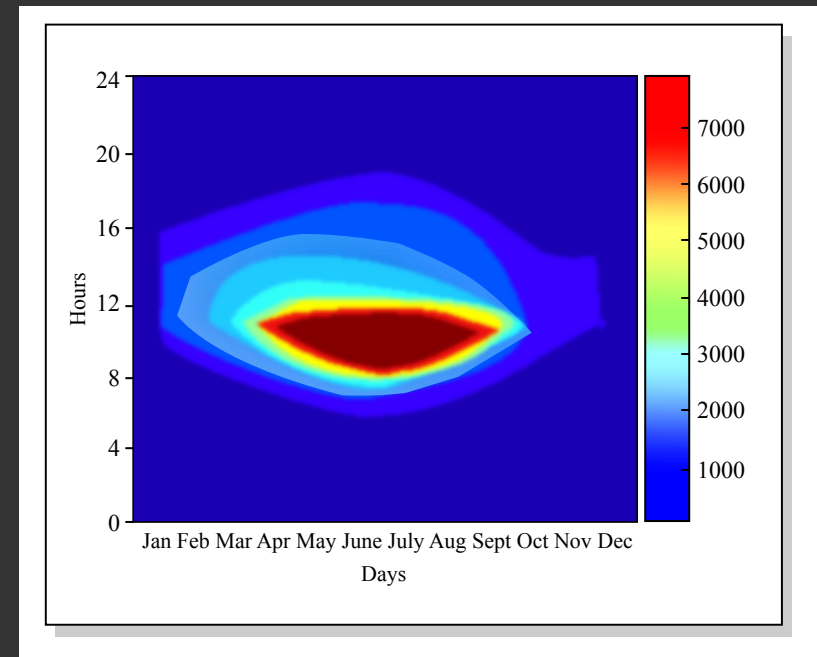
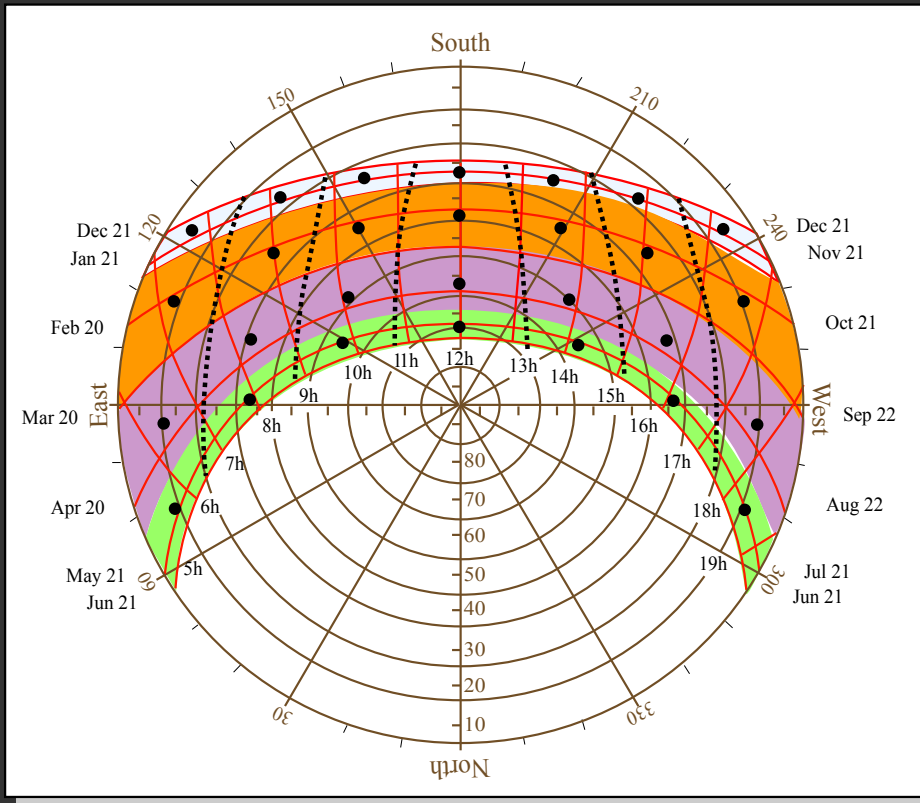
■ metrics

- illuminance
- glare
- "enhancement"

Advanced Simulation Tools

► The "LightSolve" project

- metrics
- daylight dynamic

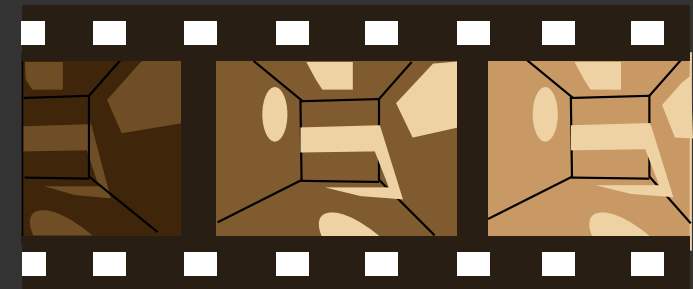
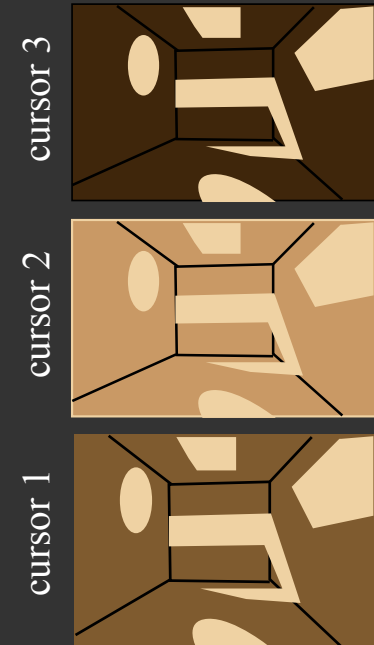
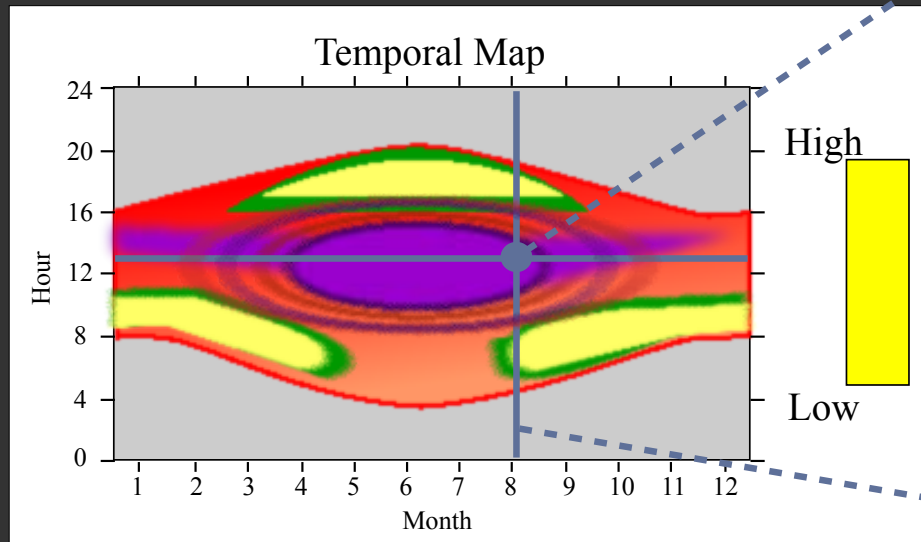


Figures by MIT OCW.

Advanced Simulation Tools

► The "LightSolve" project

- metrics
- daylight dynamic
- graphical representation



movie (full day/year)

Advanced Simulation Tools

- ▶ The "LightSolve" project
 - goals and constraints
 - optimization process