


Designing the Research Experience

Task Specification

What concepts and skills are required?

Math, physics, programming, simulation, electronics, experimental techniques

How much time is available to train the students?

Determines expected prep of students

How many students will be involved?

2 are easier than 1 by far.

How much time can the students spend?

Min time, max available; differs in summer vs. academic year

What aspects of the research task can the undergrads own?

Not just grunt work; have to also be partners

Exercise: specify a research task a pair of freshmen could accomplish in 10 weeks.

If big scale, they need to be given smaller part, with model (either experiments or software)

On boarding

Review of concepts and skills

Relating the research to these concepts/skills; as part of discussion evaluate their mastery; quickly transition to practical use of skills

Lab skills: safety is paramount; then get to lab-specific procedures

Social: introductions, social inclusion; logistics of where they work; assign mentors for first line interactions

Exercise: for the task outlined in our first exercise, what skills need attention in on boarding?

For simulation task: programming language review; main equations and what they mean and what to expect; example code review; modular programming and debugging; documenting of code, archiving standards, how code is shared within group; statistical tests for significance of results.

Ongoing student interactions

Schedule

Capstone report, presentations at major milestones, weekly group meetings, daily check-ins with mentor

Tasks

Clear division; details require some interactions.

Assign some things that can be done in parallel—read further while experiment or simulation running to avoid down time

Professional development

SURP provides professional development; talk about opportunities for follow up work

Social: summer great time for activities as a group; advisors give permission or do major planning; meals are popular; can sometimes be several lab groups

What are some social activities?