Research on a Small Scale

Ishwar Sethi, Oakland University
Holly Yanco, U. Mass – Lowell
Karen Sutherland, Augsburg College

Key:

    = text from initial workshop outline

    = comments made during workshop

Additional Workshop Participants

- Orlando Baiocchi
  UW-Tacoma

- Martin Berzins
  University Utah

- Betsy Bizot
  CRA

- Kim Bruce
  Pomona

- Alva Couch
  Tufts/USENIX

- Geoff Kuenning
  Harvey Mudd

- Andrea Lawrence
  Spelman

- Melissa O'Neill
  Harvey Mudd

- Othoniel Rodriguez
  Polytech U – P.R.

- Sunil Shende
  Rutgers

- Ellen Walker
  Hiram

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What is Small Scale Research?

An increasing number of CS faculty at relatively small universities and colleges are developing research programs. Due to factors such as limite facilities, teaching loads or institutional culture, research projects tend to be "small scale."

"When scientists at small colleges and universities seek research grants, they often run into challenges not faced by their colleagues at major institutions. It is, nonetheless, possible to maintain a research program at a small institution -- if you have a great deal of passion and a little ingenuity.

Big Research, Small College, Karen M. Marki
The Chronicle of Higher Education, 19 February 200

Overview of Workshop

- Panelists' backgrounds

- Contributions of small scale research

- Working with students

- Developing a small scale program

- Funding opportunities

Contributions

- Is there a place in the research community for small scale research programs?

    - Yes, but do not work alone. Work with other educational institutions or with corporations or public institutions such as museums.

Contributions - continued

- Does a small scale program imply a small scale effort?

    - Required effort is greater.

    - Undergraduates need day to day supervision.

    - Effort in terms of code generation may be smaller scale than for a large program. Do not try to build enormous artifacts. Ask how much is doable.

Contributions - continued

- Can small scale research be cutting edge?

  – Cutting edge can be easier with undergraduates. Their naivety is often good. You must, however, guide them toward a sensible strategy.

  – Figure out the right problem. Choose the right scale. Break off student size pieces.

  – Pick projects carefully. The right area is key. Avoid a hot area that numerous people are working on. Look for something more obscure. Find a niche.

Contributions - continued

- How can the research contribution of a small program be maximized?

  - NSF Highlights could feature some small scale projects.

  - Publishing is difficult for a small scale program. Double blind reviewing should help eliminate this problem.

  - Do not try to compete with major centers.

  - Grab the opportunity to take risks.

  - Produce tech reports and good Web sites.

Contributions - continued

- Is it possible to become an established researcher with a small scale program?

  - Write "safe" papers first. Once established, take more risks.

  - Participate in an RUI at a major research center. Make a research footprint then branch out on your own.   "You can't beat them, so join them."

  - There are multiple paths to making a research footprint. Sometimes this can be a branching from the thesis work.

Working with Students

- At some schools, undergraduates are stronger than graduate students. Undergraduates must be highly motivated.

- Maintain a strong structure as students leave and come on board. Students training students is a good way to transition.

- Exposing undergraduates to research is a major goal. Even if the research is not very successful, the educational experience is. Rejection is a learning experience.

Starting, Maintaining, Growing a Small Scale Program

- Institutional/departmental support
  - Develop undergraduate research courses.*
  - Require all majors to do research for credit.
  - Encourage institutional scholarships for undergraduate research.
  - Provide departmental funding for student research
  - The department chair may have to be creative in dealing with the administration.

* Walker, E. L. and Slotterbeck, O. A. 2006. Integrated research components: a practical and effective alternative to senior projects. J. Comput. Small Coll. 22, 1 (Oct. 2006), 72-83.

Starting, Maintaining, Growing a Small Scale Program

- Institutional/departmental support - continued

  - Work with the institution's officer for research to avoid unrealistic indirect costs on grants.

  - Return to the PI of part of the indirect costs on grants is very important in smaller programs, providing funds to move forward and do the work required for successful subsequent proposals.

  - Providing funds for a faculty member to travel to D(and talk to program managers at NSF is a worthwhile administrative move.

Starting, Maintaining, Growing a Small Scale Program

- Space and time requirements

  - A 2/2 teaching load will allow time for research.

  - Appropriating grant funds to buy out a course free up more time for research.

Starting, Maintaining, Growing a Small Scale Program

- Collaborations

  - A small piece of a big project - Example:

    - NSF IU-CRC

  - Multi-disciplinary projects - Examples:

    - Artbotics at U Mass – Lowell
    - Capstone project with a School of Nursing
    - Team teaching
    - Co-advising

  - Multi-institutional projects

  (All of the above form faculty connections.)

Starting, Maintaining, Growing a Small Scale Program

- Community Building
  - Be part of a community
  - Go to conferences.
  - Take students to conferences
    - The conferences often provide student support. (Ex: USENIX, AAAI volunteers, ACM SIGCSE)
  - If breaking into another community when doing interdisciplinary research, ask what the important questions in that community are. Immerse yoursel in that community.

Obtaining Funding

- Funding often must be creative.

- What is funded research?
  Research grant funding and educational grant funding are not separate entities. Most funded projects contain both components.

- Serve on NSF panels. Chairs: help junior faculty be assigned to NSF panels.

- Invite NSF Program Directors to speak at your institution. There is no fee.

Obtaining Funding - continued

- Funding sources:
  - NSF
  - CRA
  - Industry
    - A good place to get seed money. It is a cheap investment for industry.
    - Address the issue of industry not providing overhead and the administration expecting it by asking the industrial partner what their internal overhead rate is and requesting a fraction of that.

Finis

In a very short 90 minutes, the workshop participants discussed many of the important issues facing those of us who run small (and not so small) scale research programs. These slides summarize that discussion but do not come close to capturing all of the exciting ideas shared.

KTS

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