

Building a research program at an American university: strategies for sustainable success

Jerzy W. Rozenblit

Distinguished Professor/Raymond J Oglethorpe Endowed Chair

Dept. of Electrical and Computer Engineering

and Dept. of Surgery

The University of Arizona

Tucson, Arizona 85721

jr@ece.arizona.edu



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About us

- Professor at the University of Arizona since 1986
- Continuous funding 30+ yrs, \$24+Mil
- Work on applications of high technology to medicine, specifically minimally invasive surgery (MIS)

Our focus: laparoscopy training/MIS

- Training of basic skills using *smart* simulators
- Development of devices and methods that improve training outcomes
- Transfer of the technology to the OR
- Advancement of basic science and engineering

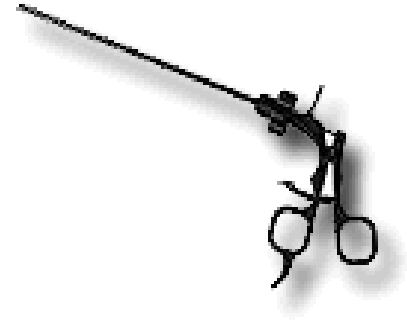
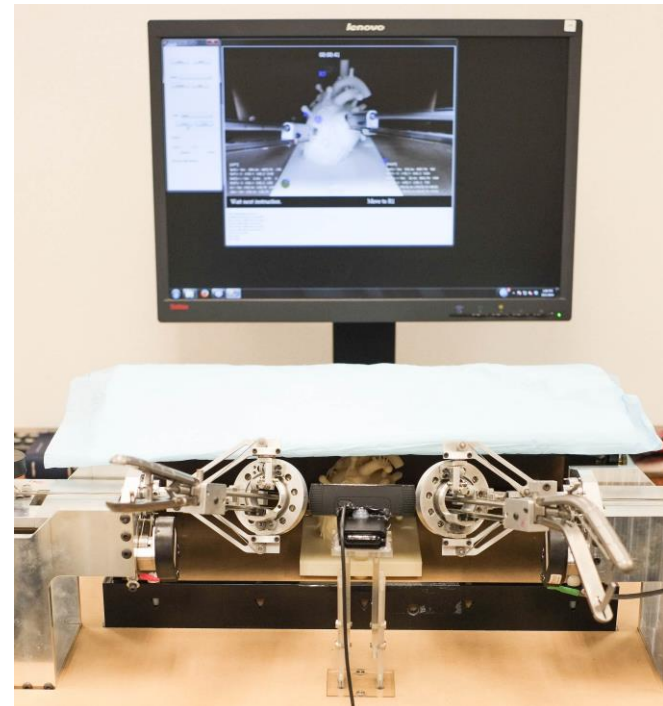


Photo credit: Good Samaritan Hospital

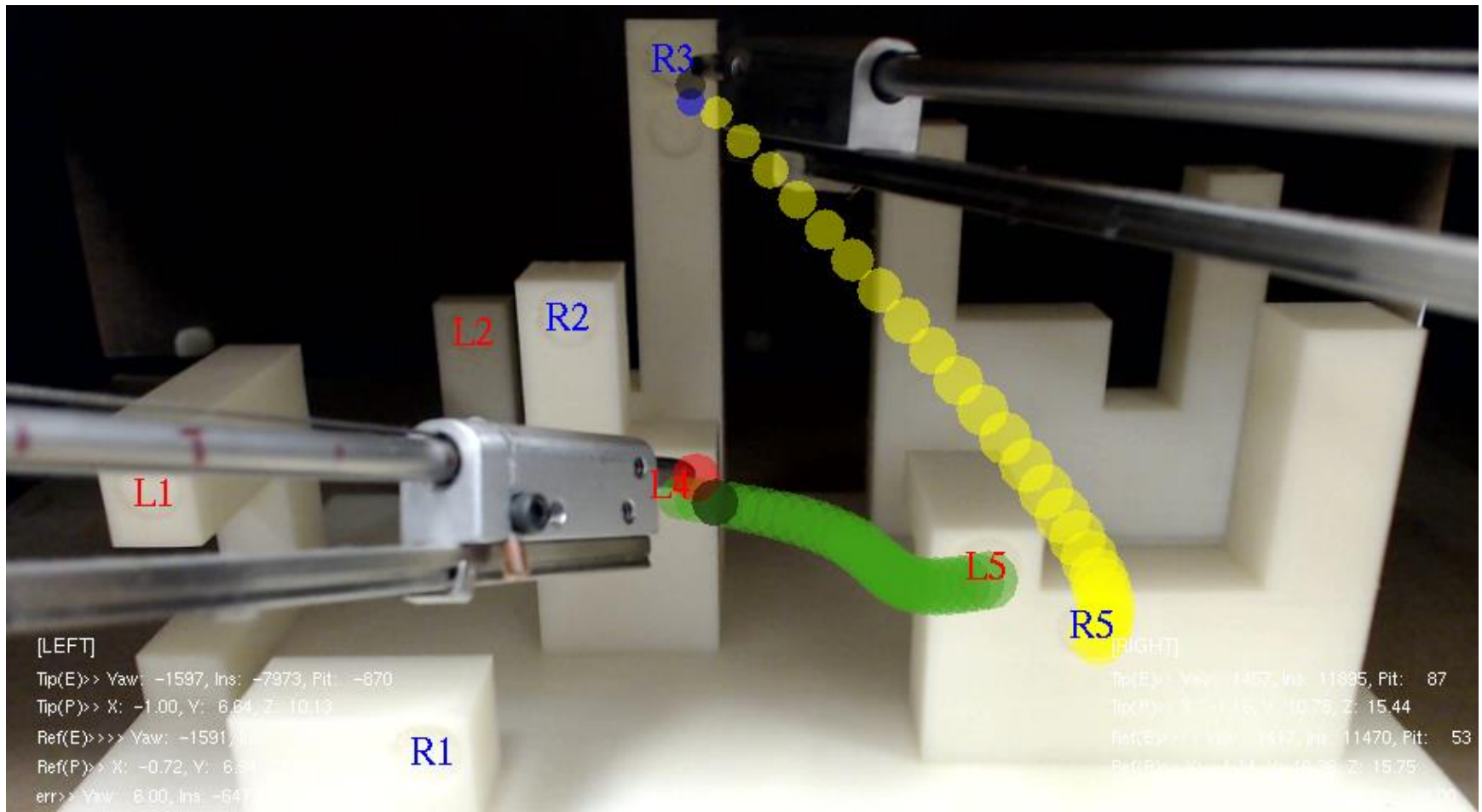
CAST (Computer Aided Surgical Training)

Problem space

- Assistive techniques in minimally invasive surgical procedures (training and practice)
 - improved situational awareness
 - better outcomes



Haptic and visual guidance



Preamble



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Outline

- Why
- The starting blocks
- Seeking opportunities
- Persistence and patience
- Doing the right thing

Why

- Intrinsic:
 - In STEM (science, technology, engineering, and mathematics) funding is a *sine qua non* condition for scholarly work
 - Personnel, equipment, travel
 - Investments/exploratory research
- Extrinsic:
 - “Bring \$\$\$s or you are out”
 - Tenure/promotion (bring money or you are out...)

The Hire

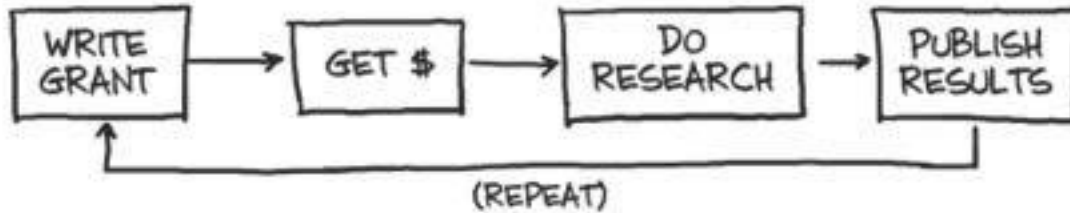
- The start-up package
 - Equipment
 - Graduate student support
 - Summer salary support
 - \$300K - \$1Mil

The pursuit

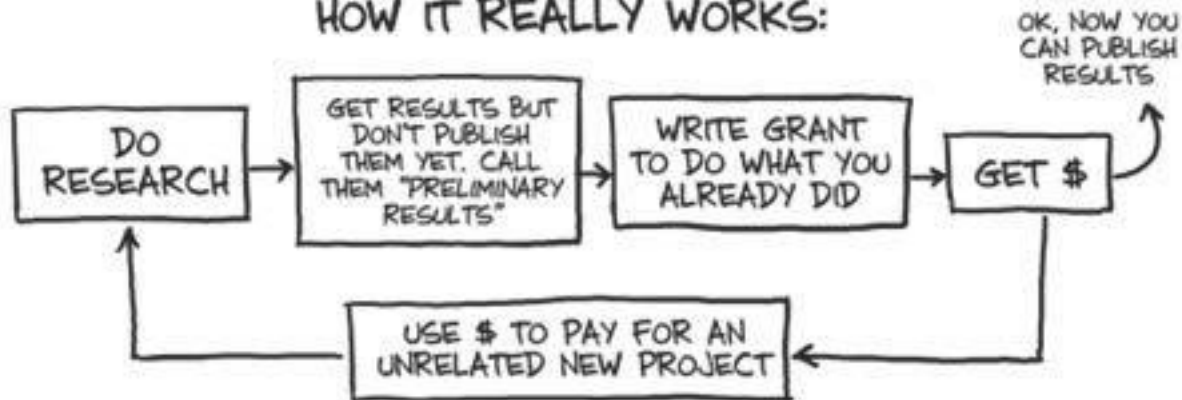
- Most new faculty are quite familiar with the funding models. Questions remain:
- What type of grants to pursue, e.g., basic, fundamental research or more applied projects?
- Where to pursue such funding from?
- Who to team up with (or whether to submit single investigator proposals)?
- How to do it?

THE GRANT CYCLE

HOW IT'S SUPPOSED TO WORK:



HOW IT REALLY WORKS:

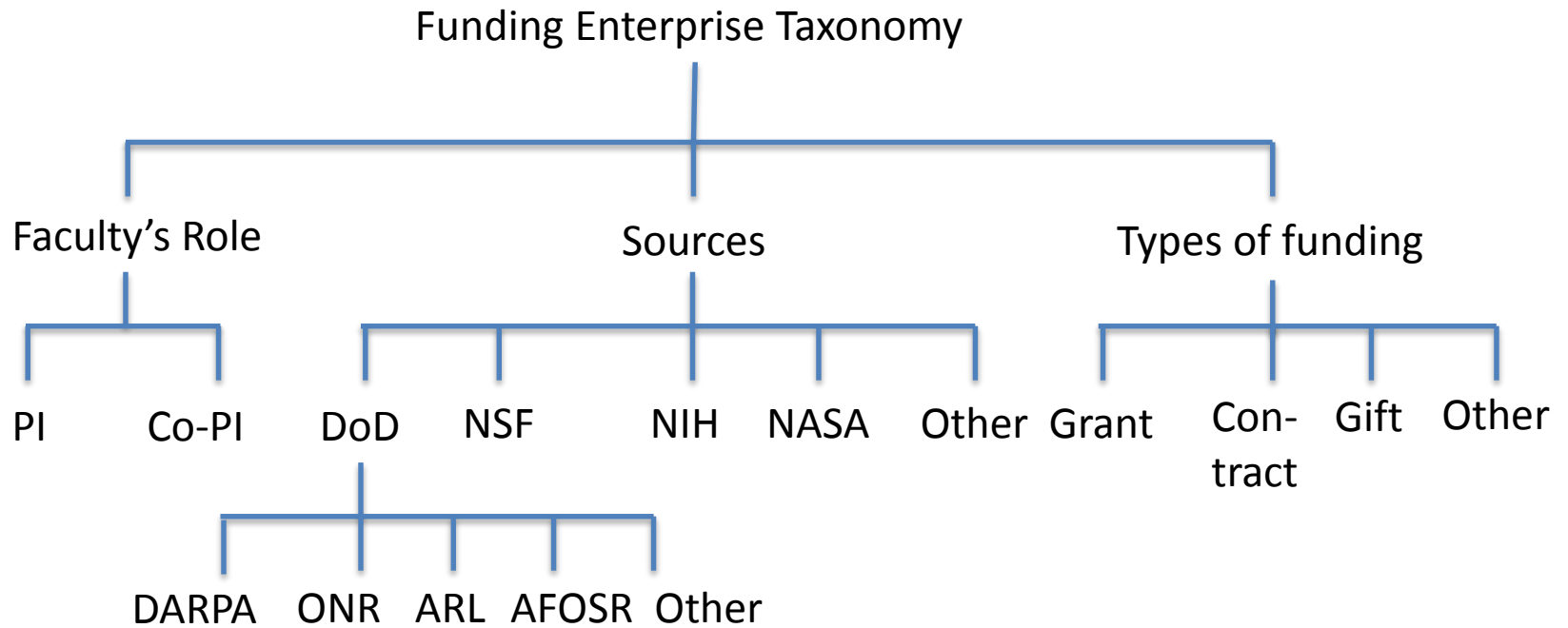


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**footnote: Thanks to Anthony from U. Guelph for this comic idea!

Funding taxonomy



The pursuit

- The fundamental prerequisites:
 - good, creative and novel ideas
 - well written proposals
 - an excellent, credible team with complementary areas of expertise and track records (Co-PIs who have a record of funding)must be in place for the proposal to be competitive.

The pursuit: “timeline”

- Establish a laboratory and recruit graduate students using start-up funds.
- Identify pending grant requests and start building collaborative ties with colleagues in the department and across the university.
 - In departments with a strong culture of mentorship, senior colleagues often extend an offer to join an existing center, participate in an ongoing project, or team up on proposal preparations that they will lead.

Timeline

- Office of Vice President for Research offers help in identifying opportunities.
- The work (on start-up funds) gains momentum, preliminary results, early publication drafts, and conference papers, form the foundation and evidence for ideas proposed in grant applications.
- Proposals are written and budgeted
- Typical budget:
 - faculty's summer months, Research Assistantships, travel, equipment, etc., are built into the budget.
 - Some grants offset a portion of the academic year (AY) through AY buyout.
 - Budgets also include overhead (indirect costs), roughly in the 50% range of the direct costs.

Timeline

- Proposals get submitted and the anticipation begins.
- The evaluation process takes from a few to several months.
- Some agencies ask for a preliminary “white paper” proposal concept which serves as an early filter.
- Decisions are more often than not negative – the odds of winning an award may be as low as 5-8%
- “What now?”, a disappointed and often frustrated junior faculty asks.

Persistence and patience

- Strong encouragement and pragmatic advice is needed so that junior faculty can persist in grant competitions
- *Focus the efforts on the core areas of your expertise*
- *Develop an excellent understanding of what the RFP calls for:*
 - RFPs contain good but often broad descriptions of what the funding agency is seeking, what outcomes it expects
 - consult with Program Managers/Directors responsible for a specific call to get detailed insights
 - Examine current grants in the program to know what types of proposals won funding and who the investigators are.

Advice

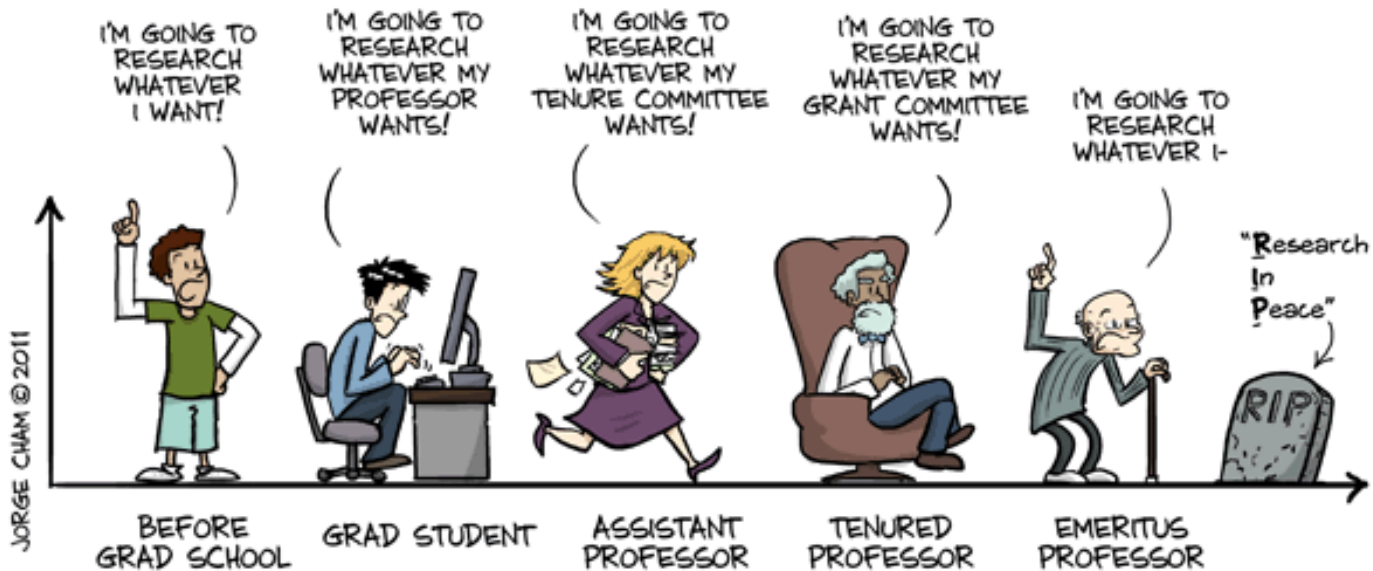
- *Visit funding agencies: “face time”*, direct personal interactions with Program Managers (PM) assist in understanding the scope of programs and RPFs as noted above.
- *Team up with strong partners:* for a multi-investigator proposal, invite colleagues with excellent reputation and funding record to participate.
- *Follow-up with PMs on declined proposals:* proposal evaluations are shared with the Pis.
 - Ask for guidance in revising the proposal so that it can focused better and re-submitted in the next evaluation cycle.
- *Ask for exploratory/seed grant opportunities:* discuss with PMs a possibility for a small exploratory grant to prove your ideas.

Advice

- *Volunteer to serve on review panels*
- *Take an active role in formulating RFPs:*
 - participate in workshops and conferences and offer your assistance in formulating directions for the program..
- *Become a Program Manager:*
 - as you mature in your professional career, gain tenure and get promoted to higher ranks, serve as a PM with a funding agency.
- *Sustain your efforts:*
 - in the likely event that ultimately some of your proposals will get funded, do not rest on your laurels and plan accordingly for how to sustain, and grow the program
- *Do not give up!*
 - However frustrating the process might be, good ideas and proposals get funded as evidenced by the many active projects all across the country.

Do the right thing

THE EVOLUTION OF INTELLECTUAL FREEDOM



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Do the right thing

- Hypercompetitive academic environment
- Relentless pressure to bring in research dollars
- Quantitative metrics of productivity
- All of the above may distort faculty's efforts and lead to substandard outcomes, decreased quality, and loss of integrity in academic conduct.
- Junior, untenured faculty are vulnerable and very susceptible to such pressures
 - successful promotion and award of tenure

Do the right thing

- Ensuring that they act with high integrity and a sense of purpose falls on university administration and good mentors who should create a nurturing culture in the units.
- Faculty should embrace the values of academic ethics, quality, and high standards, and understand that good work combined with diligent efforts does get rewarded in the long run.

To a good, productive future 😊



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