**2012 NSF ERC Industry Liaison Officer Retreat**

Held at the Quality of Life Technology Center

Carnegie Mellon University

June 20 & 21

*Report prepared by Jim Osborn and Kristen Sabol, both of the QoLT Center*

**Attendees**

|  |  |  |
| --- | --- | --- |
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| Bernadeta Wysocka | MIRTHE | bwysocka@princeton.edu |

**Agenda**

|  |  |
| --- | --- |
| **Wednesday June 20, 2012** |  |
|   | 8:00 AM | breakfast |   |
|   | 8:30 AM | Greetings and review of the agenda | Jim Osborn |
|   | 8:45 AM | Introductions / elevator pitch overview of each ERC (1 slide) | all ILO's (2 minutes each)  |
|   | 9:30 AM | Trends in university technology transfer | Tara Branstad (CMU Center for Technology Transfer and Enterprise Creation) |
|   | 10:00 AM | QoLT Foundry - Lessons learned | Jim Osborn, Gary Miller & Brendan McManus |
|   | 10:30 AM | Break |   |
|   | 10:45 AM | Entrepreneurship education for ERC students | Peter Keeling & Bernadeta Wysocka |
|   | 11:30 AM | Innovation Accelerator and the ERCs | Traci Hancock |
|   | 12:00 PM | Lunch |   |
|   | 12:45 PM | Conflict of interest management | Ann Mathias (CMU Office of Research Integrity & Compliance) |
|   | 1:30 PM | Developing partnerships with {Federal, state, local} agencies | Eric Erenrich & Josh Dickinson |
|   | 2:15 PM | Break |   |
|   | 2:30 PM | NSF Update | Deborah Jackson |
|   | 3:00 PM | Perfect Pitch competition | Silvia Mioc & Rad Roberts |
|   | 3:30 PM | Post-NSF sustainability (planning for and surviving graduation) | Jimmy Zhu & Dan Siewiorek (former ERC Directors who’ve been there and done that) |
|   | 4:15 PM | CMU & QoLT Center Tour  | Jim Osborn |
|   | 5:15 PM | charter bus to Pittsburgh Golf Club | between NSH & CIC |
|   | 5:30 PM | Reception (cash bar) & dinner |   |
| **Thursday June 21, 2012** |   |
|   | 8:00 AM | breakfast |   |
|   | 8:30 AM | Industry relations - introduction & discussion framing | Erik Sander |
|   | 8:45 AM | How to find - and know you’ve found - the right contact person in a prospective member company | Leonard Katz |
|   | 9:30 AM | Articulating the value proposition of research to members and prospects | Erik Sander |
|   | 10:15 AM | Break |   |
|   | 10:30 AM | Managing the expectations of faculty, industry, NSF, others | Rad Roberts |
|   | 11:30 AM | IAB Member account management | Erik Sander |
|   | 12:00 PM | Lunch & Adjourn | Box Lunches |

**Introductions / Overview**

Each ILO introduced him/herself and his/her ERC. Only a few used slides.

**Expectations**

The attendees were asked to articulate one or more expectations of the Retreat. Some were met, others are potential discussion topics for the Annual Meeting, the post-Annual Meeting ILO meeting, ILO Working Group Internet meetings or future Retreats.

|  |  |  |
| --- | --- | --- |
|  | expectation | status |
| Member Recruiting |  |
|  | Learn of good approaches identify new Member prospects, especially big companies | met |
|  | Learn of successful marketing techniques to sell the value proposition | met |
|  | Learn what tools ILOs use (e.g., Customer Relationship Management) | unmet |
|  | Learn how to balance short term industry needs and the ERC’s long term vision | met |
| Member Relations |  |
|  | Learn how to build a culture of Members, faculty, students | unmet |
|  | Learn how to deliver value to Members | met |
|  | Learn what makes a good (valuable from the Members’ perspectives)  | met |
|  | Learn how other Centers involve IAB in project review, project selection, etc. | unmet |
|  | Find strategies to move larger companies towards active engagement | unmet |
|  | Learn how to get enduring involvement of companies | unmet |
|  | Learn the Membership structures of other ERCs | unmet |
|  | Learn how to get more than the minority of students involved in entrepreneurship | met |
|  | Learn best practices that can be applied overseas | unmet |
| general |  |
|  | Harvest / adapt something new | met |
|  | Hear about things that DIDN’T work | met |
| general ERC management |  |
|  | Hear more about sustainability strategies\* | unmet |
|  | Learn how to address the diversity of ideas (nascent/mature, big/small, …) | unmet |
|  | Learn how to think and operate better as a multi-university center | unmet |

\* potential cross-functional session at the Annual Meeting

**Trends for University Technology Transfer**

Tara Branstad (CMU Center for Technology Transfer and Enterprise Creation)

Highlights & key points (see attached slides)

Many university administrations emphasize royalty revenue stream and thus view that to be their TTO’s top priority. CMU’s view of tech transfer is as a service to faculty, staff and students. An additional reason for CMU’s focus on startups is regional economic development, which is an element of the university’s strategy.

Open sourcing and putting intellectual property into the public domain are two different things. The former requires licensing.

A common misconception is that only patented things can be licensed. Copyrights, know-how, etc. can also be licensed.

Companies look to license patents for freedom to operate more than for the technological content itself.

Patenting is expensive to the university and often not worth the money. At CMU the decision on whether or not to patent is a conversation between all the people involved in the process – inventors, students, ILO, tech transfer, sponsor, etc. Patent budget at CMU is less than 1M a year.

Most universities replace only a tiny portion of research revenues with tech transfer revenues. A fifth can’t cover their patenting costs. Few are picking “big winners” to license.

Revised TTO mission: Faculty service organization with focus on dissemination of new technologies consistent with mission of universities.

CMU will front US (only) patent costs to a CMU startup.

The basis for corporate relationships to universities is changing. Companies want to be aware of research, want access to our people, incremental improvements, sometimes work-for-hire. Big companies have technology scouts who look beyond just incremental.

Many companies are more interested in CMU startups than CMU; they invest after market or product is established. In that sense CMU uses start-ups to fill the gap between proof of concept and commercial viability.

There are many issues regarding pre-set license terms.

**Entrepreneurship & Innovation – part 1**

Peter Keeling (CBiRC)

Highlights & key points (see attached slides)

CBiRC’s inventions are typically not picked up by IAB Members, hence available to non-Members or for translational research. VCs will not fund if there is residual technical risk, which is usually the case.

A characteristic of their industry (agricultural biotechnology) is for big companies to acquire startups.

The “Darwinian Sea” is an alternative description of the “Valley of Death” phenomenon that confronts startups.



There’s an earlier stage challenge of getting from discovery to proof-of-concept called the “Ditch of Despair.” CBiRC is meeting that challenge with technology-led entrepreneurship that addresses awareness of faculty and students to the various issues. At the core of their approach is a course that is required of all students in the Center that walls them through the steps of creating a startup. Students follow a template to articulate the approach to forming a new-co (see slide #15). This is part of a “Biobased Foundry” process similar to the QoLT Foundry in which course outputs are refined into business models suitable for funding from NSF iCorp, i6 Green (supported by US EDA), SBIR programs, etc., culminating in full business plans.

**Entrepreneurship & Innovation – part 2**

Bernadette Wysocka (MIRTHE)

Highlights & key points (see attached slides)

MIRTHE leverages three Princeton courses (undergrad and grad level) and the Entrepreneurship Lab (a 10-week summer immersion in entrepreneurship). The latter is funded by the endowment and part of the Keller Center. MIRTHE also leverages Princeton’s Entrepreneurs in Residence.

MIRTHE created an Investment Focus Group to introduce angels and VCs to MIRTHE technologies and applications. Students make oral and poster presentations in workshops (see slide #4).

They also encourage students to participate in business plan competitions, elevator pitch competitions and trade shows. Their student retreat includes an Industry Focus Forum.

Lessons learned:

* Make sure you select people who are from well-known, well-established investment companies to participate in these events.
* Teach students about what investors look for.
* Don’t seek investments in those forums, rather, get feedback on what they would invest in in the future.
* Since it’s difficult to get investors to sign non-disclosure agreements, leave enablement and IP details out of presentations.
* It’s important to get students out of their labs – and they appreciate opportunities to show off their work.
* Let students make the case for participating to their faculty advisors.
* Benefits include connecting with mentors, local entrepreneurial networks, and agencies.
* Work with tech transfer office at partnering universities

**Innovation Accelerator & ERCs**

Traci Hancock (Innovation Accelerator Executive Director)

Bill Thomasmeyer (Innovation Accelerator Director of Corporate Outreach)

Highlights & key points (see attached slides)

Innovation Accelerator is the private side of a public-private partnership with the NSF. Its initial focus is assisting NSF SBIR and STTR grantees with commercialization. IA is piloting work with EPA and Dept. of Education grantees.

IA has an extensive network that includes the Kauffman Foundation, USPTO and other federal agencies, experienced serial entrepreneurs, and industry leaders to help the companies

Observation: all ERCs face a similar, general technology commercialization challenge of their corporate members not being positioned (or willing) to license and commercialize technologies emerging from ERCs. The reasons include the technology being too early stage, market opportunities not being clear, high risk, and IP not being valuable enough. Yet they are still interested in what ERCs do.

Observation: universities invent, start-ups convert inventions to innovations and make them market-ready, established corporations scale the innovations.

Proposed new model for ERC tech commercialization and how IA can help:

* Educating the students and stakeholders in entrepreneurship
* Connecting and engaging business representatives
* Involving entrepreneurs to mentor and assist
* Partnering with Member companies to advise on new ventures
* Funneling resulting opportunities into the NSF SBIR program

Example case study – Refactored Materials – spin out of SynBERC

Tactical ways IA can help:

* Interactive workshops (MIT, Stanford, CMU) – bring in phase II grantees to present to interested students, local community, etc. panels to share stories
* Develop / adapt entrepreneurial training curriculum
* Web-based Toolkit for ERCs
* Entrepreneurial Mentoring Program
* Identify a “Path to Success” – from ERC to commercialization via NSF

Action item: Deborah meet with Traci to determine what might work best, get things moving

Action item: determine if NSF databases, including ERC qrc web, can be tapped to extend IA’s network.

Issue: can/will ERC’s provide contact information of their Member companies

**Conflicts of Interest**

Ann Mathias (CMU Office of Research Compliance)

Highlights & key points (see attached slides)

COI exists when there is the possibility – or the perception of a possibility – that a person’s financial interests could influence professional actions, decisions or judgment. COI exists when the reviewers reasonably determine that a significant financial interest could directly and significantly affect the design, conduct, or reporting of NSF-funded research or educational activities.

Key messages:

* COI is not inherently bad. In fact, it can be a reflection of an investigator’s success.
* Disclose, disclose, disclose

NSF requires that investigators disclose to the institution significant financial interests (SFI), an equity interest greater than $10K or more than 5% ownership in any single entity

Salary, royalties or other payments that, when aggregated for the investigator and the investigator’s spouse and dependent children, are expected to exceed $10K during a 12 month period

NSF rules only require you to disclose SFI that you believe are COI. New NIH rules require you to disclose all significant financial interests to your institution, which then determines if any of them are COI.

Critical questions:

* Does the flow of funds create a situation where research might create undue financial benefit to investigator?
* What is the risk that the research will be biased?
* Could the facts be construed to create a perception of conflict?
* What is the risk to the investigator, the research and the institution?

Manage, reduce or eliminate conflicts by:

* Public disclosure of SFI
* Monitoring of research by independent overseers
* Modification of research plan (sometimes have to change project roster)
* Disqualification from participation in the portion of research that would be affected
* Divestiture of significant financial interests
* Severance of relationships that create conflicts

For subcontracts:

* Is the work being subbed appropriate or not for the university?
* Does the university have the capability to the work that is being subbed
* Is the subcontractor genuinely the best choice? Has a competitive analysis and bid process been used?
* Are transactions being conducted at fair market value?
* How will resulting IP be handled?
* Can/should management plan be put in place?

Interesting question: what if the university has an equity interest in the subcontractor? Answer: the office of sponsored research is watchdog.

CMU takes a more lenient approach than many other universities.

See case studies (slides #15-19)**Developing Partnerships With Federal, State, Local Agencies – part 1**

Eric Erenrich (CSOPS)

Highlights & key points (see attached slides)

The Federal government cannot be in conflict with itself. Sometimes strategic directions – details of why they want some things – can’t be shared, but can at least help set some higher order goals that segue nicely with national needs.

CSOPS technology (pharmaceutical manufacturing) is very tied up by regulatory considerations. Early in the Center’s existence they had a meeting of NSF and FDA to get the latter involved, specifically to identify research that would facilitate the FDA approval process and to help educate FDA. Motivations for getting FDA onboard included speeding future approvals (and increasing the likelihood of acceptance) technologies born in CSOPS and adopted pharma technology suppliers.

FDA is a Member of CSOPS at level 2 (level 4 is their highest). As such, it is excluded

from discussions the pharma companies might want to handle as an executive board. It receives reports and participates in IAB meetings and training sessions.

Case study: CSOPS prepared a white paper intended for FDA’s consumption as guidance, but instead published it for awareness/reference, so as to avert FDA too strictly adopting the white paper recommendations by turning them into a future checklist. The technology itself is likely to evolve between now and when it is eventually deployed.

Many CSOPS faculty have additional/separate relationships with FDA (see slide #6).

**Developing Partnerships With Federal, State, Local Agencies – part 2**

Josh Dickinson (ReNUWIt)

Highlights & key points (see attached slides)

San Pablo Avenue Green Spine project launched through partnership of ReNUWIt and local agencies and other organizations. Each partner has a defined, meaningful role.

Partner cities are Oakland, Emeryville, Berkeley, Albany, El Cerrito, Richmond and San Pablo.

Benefits include

* Project of this scale not possible without budget/funding
* Increased visibility in the community
* Expertise that’s not available
* Augments existing ERC storm water research with minimal expenses

**NSF Update**

Deborah Jackson (NSF)

Dialog session

3 new ERCs to be announced in Sept-Oct 2012, all focused on nanotech (they’ll be “NERCS”)

SECO review panels July 16-19

The ERC tri-fold marketing brochures are to be replaced by a marketing video

* Ask each ERC supply name of IAB members whose enthusiasm is infectious
* Videotape them testifying to the benefits of being members of ERC
* ILOs to identify a set of questions that each interviewee will answer
* Court Lewis will aggregate into one
* They will use the language that appeals to that industry

Discussion: Expectation that this video used to explain what the role of the IAB should be in the ERC is a cross-purpose. If that’s an issue, the ILO or Director should address it. Instead, the purposes should be extoling the ERC program to Congress, potential IAB members and others.

General suggestions:

* Get CEOs of major companies, e.g., J&J, Ratheon, Lockheed Martin, Dupont, IBM, GE, Intel
* Span the four sectors covered by the ERCs
* Have them mention access to rock stars of academic world and government players
* Showing the kinds of collaborators you could gain access to
* Need to be specific and keep it really short
* In addition to the video, update and reissue the brochure

Specific things the CEOs might touch on

* “You’d be surprised to know…”
* How has this public/private partnership helped create jobs for society?
* How has this public/private partnership helped create products for society?
* How does this enable US to maintain leadership, dominance, and competitiveness into the next century?
* How do we create an educated, diverse workforce to prepare for competitiveness?
* Understanding of the investment in America’s future –
* Trusted use of taxpayer money

The ERC Association website is barebones and aimed at engineers. If NSF uses it for marketing the program outside the ERC community, it needs work. If not, it’s probably OK.

**Elevator Pitch Contest**

Silvia Mioc (Smart Lighting)

Highlights & key points

They have been training students in elevator pitches for three years.

Pitches are not geared towards selling a start-up to a VC. Rather, they are for selling ideas of any kind, which is a transferrable skill. Their focus is the students’ research.

Comment: In the ERC program wide competition last year, it was not clear last year what the students were pitching: their research or a startup based on their research. Also, many of the education directors were not plugged in.

Goals of Smart Lighting’s competition:

* teach students to be concise and persuasive in talking about research
* stimulate students to think about bigger picture
* emphasize oral communication and public speaking
* stimulate good performance under pressure
* engage IAB and innovation partners
* empower students to lead

Tools that Smart Lighting developed:

* Checklist of things to think about at the local level
* Powerpoint template
* Example worksheet – time suggestions (context, problem, proof, promise)

Their implementation:

* Students craft preliminary elevator pitch with advisor
* Recorded coaching sessions
* Practice sessions – students ILO others give feedback
* Finalists selection the night before industry conference
* 8-10 finalists on main industry conference agenda (30 min)
* Cash prizes sponsored by industry/tech transfer office
* All participants received diplomas
* Post-docs can participate in training but not compete

Lessons learned:

* Distribute format instructions and judging criteria to students, faculty, judges
* Send judges abstracts so they can familiarize themselves with the topics

**ERC Beyond Sustainability – part 1**

Dan Siewiorek (CMU Engineering Design Research Center, class of 1986)

Highlights & key points (see attached slides)

Secure funding from Provost for the core (leadership, admin, management)

 Initially fixed, then incentive based via overhead return

Secured discretionary funding (for new projects, to attract faculty)

 Partnered with Lehigh to secure line item funding in the state budget

Defined personnel

 Research faculty

 Director treated as Dept Head

Defined mission

 Broadened scope, changed name to Institute for Complex Engineered Systems (ICES)

Ensured non-compete with departments

 Different funding model

 grad student funding to their parent departments, not ICES

 Set guidelines for nature of research

 Cross-disciplinary stuff that single departments wouldn’t pursue

 Release time from depts. for faculty to teach ICES courses

Developed unique services to attract faculty

 Business personnel w/experience with multiple agencies beyond typical department

 Graphics designer

Maintained an industry consortium

It took a year and half to put all of the above in place

**ERC Beyond Sustainability – part 2**

Jimmy Zhu (CMU Data Storage Systems Center, class of 1990)

Highlights & key points (see attached slides)

Always have had a strong industrial affiliates program

 25 members in 2001; since then dramatic consolidation in the hard drive industry

 Still have all the major players except one

Worked on this a long time to make sure biggest companies are on board

Membership structure

 $125k/year buys a directed research project (grad student or post-doc)

 $250k/year buys two

 Right now all members in $125k/year

 Non-exclusive royalty-free licenses

Center remains attractive because

 Faculty know all the technology in the industry

 They think 2-5 years ahead of industry

 Projects are inter-related

Differences between methodology and artifact centers

 Easy for artifact center to draw a roadmap

 Much harder for methodology center

**Industry Relations**Erik Sander (UF & consultant)

Highlights & key points (see attached slides)

Account Management vs. Key Account Management (see slides #3 & 4)

**Securing the Correct Company Contact in Recruiting**Leonard Katz (SynBERC)

Highlights & key points (see attached slides)

ERCs are either selling technology or methodology, usually not both; sometimes they’re selling a new field of science/engineering. In SynBERC’s experience, most companies want products or direct roads to products.

Contact with companies have been via (in descending order of value)

* They call us
* ILO calls people he knows in various companies
* Introduction through 3rd parties (include PIs)
* Contacts made at meetings

The best contact in a company is usually a manager (or director of VP) of a technology group. However, he/she may not be the decision-maker about a dues-paying membership. Closing the deal with one of them is best done via 1) phone call / slideshow and 2) invitation to IAB retreat.

Technology scouts of large companies are less useful, but they are middlemen to technology managers (SynBERC has had <20% success rate with them). Scientists are also middlemen to technology managers. Closing the deal with a scout or scientist usually requires a company visit.

**Open Discussion**

Highlights

***IAB retreats***

Most ERCs have two per year, one being the Site Visit. Activities might include:

* project reviews (some are in-depth project discussions others are big picture)
* poster session, maybe including REU students
* presentations by industry Members
* Member/faculty one-on-one time (seed discussion topics in advance)
* Having Members do guest lectures in classes before the event itself

Invite prospective Members, but make them sign confidentiality agreement before they come.

Determining how many representatives each company is invited/allowed to send is a balancing act.

Some ERCs use the retreat to “dam up” visits to the Center by prospects.

Some ERCs have prospects attend the IAB SWOT analysis session to see firsthand how the IAB operates. Others do a separate breakout session for prospects while the IAB does the SWOT.

CBIRC charges prospects a $5K fee to attend, which includes the annual report. Non-refundable if they don’t join, but credited towards dues if they do.

Some ERCs have IAB teleconferences / net meetings in addition to the two retreat events.

***Recruiting***

When you arrange the presentation with your primary contact, ask them to invite others. Let them bring the right people to the meeting. Be sure to get an understanding of where the presentation attendees are on the org chart and how they inter-relate.

Sometimes the primary point of contact is a dud, so try to find out who the boss is. Try to build relationship with boss without snubbing the first contact.

Encourage the entire faculty to 1) pitch membership in the center, and 2) inform the ILO of contacts made with companies. It’s not always easy to get them to buy into that and sometimes that doesn’t work very well. One ERC established a development committee for recruiting with a peer-to-peer approach. SynBERC gives a research-funding bonus to faculty who successfully recruit.

Make contacts through tech transfer office and alumni affairs.

Some ERCs find it easier to make contact with engineering or R&D, but harder to get one in the business units (which often exercise indirect control over R&D). Good strategy is one contact in engineering and one in a biz unit as well.

Recruiting existing Members’ competitors works for many ERCs. Companies will use the ERC to help keep tabs on their competitors. Also recruit in Members’ supply chains.

Some ERCs have experienced that a Member would prefer to monopolize representation of their industry in the ERC.

Package invitations to campus with other events. Fridays in Fall works [for schools with good football programs].

It’s ~10 times harder to recruit someone new than to maintain existing members.

***Member relations***

What counts is what they get, what they are expected to do.

Once we have them in, we have to have at least two contacts.

Visits were important to maintain members. Had some who were wavering and the visit really made sure they didn’t leave. When is a good time to visit a member? We see technology going in a certain direction. Need to put PIs in front of them to answer to the technology.

Show where members are geographically and ask PIs or faculty if they are traveling there and try to tack a meeting on the tail end just to maintain contact.

Arm Members to take the ERC with them when they go out to visit other divisions of their company.

***Use of websites & social media***

Some ERCs use their websites to allow companies to sign up for more information. Many have both a public access and protected member-only areas.

Some have their membership agreement available for download.

QoLT exploring use of Twitter and Facebook, the latter primarily by students. An issue with the latter is how to manage what students post to avoid disclosure.

FREEDM has had good success using LinkedIn and discussion groups. Other discussers become prospects. Your participation in the discussion turns a cold call into “cool call.”

Posting a pre-print of a journal article or conference paper is not copyright infringement. Good idea to include a disclaimer about educational purposes.

**Defining and Articulating the Value Proposition**

Erik Sander (UF & consultant)

Highlights & key points (see attached slides)

One way to articulate it:

* Who you are
* What are you doing
* Why can you do it better than anyone else
* Who cares, why they care, and how much do they care
* How will [the listener] benefit
* How others can benefit

Some debate about whether it’s necessary – or wise – to customize your value proposition to each potential Member.

How do you measure how successful you’re being in continuing to articulate it?

ERCs can deliver

* financial impact
* knowledge
* technology
* talent
* relationships

Students always come out way on top in terms of the value proposition; contracts and IP come out on the bottom. Key differentiators are that ERC students understand systems level engineering and can work in interdisciplinary teams. Some companies have reported that ERC students are a year-and-a-half ahead on the learning curve relative to other new employees. That can be monetized and compared to dues costs.

Some ERCs include access to infrastructure, e.g., special experimental facilities, instrumentation, etc., in the their value proposition.

Need to understand

 If the company is looking for individual technologies or a pipeline (or neither)

 If it is looking for talent

 Its ROI horizon (timescale).

Two models of R&D – corporate centralized or decentralized small organization units – both exist. In the corporate model, the firm has made a decision to allocate resources towards research as part of the business model. That gives an ERC a longer time horizon for engagement.

**Managing Expectations**

Rad Roberts (CNSE)

Dialog session

Stakeholders we have to tend to: faculty, students, staff, NSF, industry members. Have to keep them all happy.

Recruiting is the first opportunity to set expectations – may not wish to set the bar too high if it might come back to bite you.

Horror stories:

* Different parts of the university being involved in Member invoicing.
* Company interpreted a major technical success stories as being regular occurrences, then being disappointed to learn they’re not.
* Early on in the ERC, students did not know what they will be expected do as part of an ERC above and beyond what they were already asked to do. Partially remedied by annual orientation session every Fall.
* Researchers and Foundry personnel had mismatched expectations about who will do what toward development of a translational business model.

Researchers, especially students, don’t understand they are expected to write invention disclosures even if they’re not in an ERC. That is a university problem. Researchers need to understand that if they take ERC funding, they may be giving up the opportunity to create a startup based on their research. These were partially remedied with a boiled down version of the membership agreement terms and a form that each researcher signed acknowledging that they understood them. Also, make sure the researchers actually do understand the university’s IP policy.

It can be difficult to get superstars to comply with additional tasks that come with being an ERC. Try to make it easy on them, e.g., allowing their assistant to do ERC data reporting, employ post-docs as deputy thrust leaders, etc. Use students to persuade them.

Some companies expect free licenses for work they sponsor – “why should I pay twice?” Point out how inexpensive the total cost is still.

Some companies expect universities to work just like engineering firms with strict schedules, deliverables, project management techniques, etc.

General sense is that ERCs need to set goals, not requirements. Goals need to be far enough out that they generate a research challenge and create an environment where students learn to work on a team towards a common goal.

* As far as setting goals, it is okay to take risks that get you working at the research frontier;
* Milestone dates become necessary in instances where one or more tasks are dependent on receiving input from another task or thrust before it can proceed;
* Failure to meet milestones should not be viewed as a complete performance failure if the team is able to learn something from the experience. For example:
	+ Before re-scoping, it is important to understand why the selected approach did not is not the best one to pursue;
	+ It is okay to de-scope or abandon a project if goal is unachievable and you understand why that is the case.