

# **Translational BioMedical Research Workshops Discussion Summary**

February 15, 2005

## Campus Advisory Committee for Translational Research

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**CTRAC Workshops**  
**February 7 – 11, 2005**

**Common Themes**

Research Infrastructure

- Communication between disciplines must be improved and facilitated
  - Fund an Office of Translational Research to serve as a clearinghouse for information about research expertise, external partnerships and pilot funding opportunities
  - Develop web-based or other information sharing venues
  - Organize periodic roundtable discussions in specific focus areas to facilitate interaction and communication
  - Encourage out of discipline seminars in regular departmental series by offering support for one or two Translational Research seminars in key departments each year
  - Negotiate a preferred vendor status with a company that specializes in acquiring pre-clinical safety and efficacy data in compliance with FDA regulations
- Develop a mechanism to identify and prioritize research infrastructure
  - Implement a planning process for acquiring new technologies as they become widely adopted by the research community
  - Suggested facility needs included small animal MRI, transgenic animal facility, bio-containment, advanced microscopy and EM.
- Develop short-term, moderate level funding (\$50-100K) to evaluate potential of a translational project or to show proficiency in a collaborative effort to attract federal support
- Missing a clinical “pull” for defining opportunity areas in TR
  - Develop a cadre of Clinician Scientists at UIUC
  - Encourage a few senior hires of researchers at the interface of the clinic and bench
  - Target some hires in Bioengineering toward clinician scientists
  - Develop strategic partnerships with other institutions
    - Clearly defined, strategic relationship with Carle
    - Build connections with the Mayo Clinic
    - Encourage focused partnerships with Washington University and Chicago research hospitals through the Regional Translational Research Center and other federal funding initiatives
- Lack capacity to fully access animal model expertise in the College of Veterinary Medicine
  - Increase number of research veterinarians on clinical medicine and comparative pathology staff in CVM
  - Develop new educational programs to make Animal Model expertise a highlight of UIUC education – Bioengineering
- NCSA’s role and possible contributions are poorly understood by the biomedical research community

- Lack of understanding around issues associated with maintaining safety and compliance is a significant barrier
  - Develop an annual or semi-annual workshop to educate faculty and students on compliance related issues and paperwork
- Lack sufficient swing space (biological research labs) for translational research projects, this particularly applied to disciplines lacking access to wet-lab space
  - Short term solutions could include development of “incubator” space in the research park

### Institutional Issues

There was an overall view that Institutional commitment to interdisciplinary and translational research is incomplete. There has been significant investment in the research infrastructure to facilitate interdisciplinary work, however many of the fundamental barriers associated with institutional organization and policy have not been addressed.

- Refine P&T guidelines to recognize value in IR & TR activities
  - Revise Provost’s communication number 9 to reflect importance of IR/TR
  - Letters to evaluators should address the impact of a faculty member’s contributions to TR and Interdisciplinary research
  - Add internal letters to P&T package
- Need more flexibility in tenure process
  - Develop alternative or flexible tenure tracks for clinical researchers
- Traditional organization of departments makes it difficult to hire talented researchers who work across disciplinary boundaries
  - Facilitate creation of *ad hoc* joint or combined tenure committees for those faculty bridging disciplines

### Long-term strategy:

There is a serious lack of expansion space for the life sciences. In addition to new hires in MCB and Biological Chemistry, BioEngineering and BioPhysics need adequate facilities in which to grow, ideally faculty members in these disciplines should be mixed rather than isolated in departmentally clustered groups. The campus should develop a long Term Strategic Plan for BioMedical Science and Engineering Building as a primary goal of the new capital campaign.

\$200-\$300M Capital Campaign  
250,000-300,000 Ft<sup>2</sup>

**APPLIED SOCIAL SCIENCES FOCUS GROUP WORKSHOP**  
**Monday, February 7, 2005 9-11am Beckman**

Discussion Leader: Tanya Gallagher  
Co-Leader: Sharon Donovan (could not attend)

Attendees:

Paul McNamara, Asst. Prof., Ag Econ  
Wojtek Chodzko-Zajko, Prof., Kinesiology  
Paul Shelton, Carle Health Systems Research Center  
Karin Rosenblatt, Assoc. Prof, Community Health  
Wynne Korr, Dean, Social Work  
Ann Bishop, Asst. Prof, GSLIS  
Adele Proctor, Prof, Speech and Hearing Science  
Herb Whiteley, Dean, CVM  
Bruce Wheeler, Prof., Bioengineering

*What do you need in your area that would move your ideas toward application to the human condition? For example what facilities, resources or expertise are missing?*

- Infra-structure needs were identified:
  1. Start-up funds for researchers to begin working together – perhaps a CRI type of mechanism
  2. Criteria to recognize excellent TR research and promote campus-wide understanding of what constitutes excellent TR research
  3. Facilities that could be used to support and conduct TR research in Chicago and other areas in the state
  4. Informational resources that would help researchers identify others on campus “Who is doing what?”
  5. Facilities on campus for the conduct of TR research
  6. MOUs/research agreements with other entities such as Carle and its network of 40 small hospitals; Mayo Clinic etc to facilitate the identification and recruitment of subjects for TR research – perhaps including databases of potential subjects that could serve as “registries”
  
- Campus cultural issues regarding the prestige/perceived value of TR and practical challenges were discussed:
  1. Needs to be identified as clear priority with rewards that are evident to faculty
  2. Need to address risk-taking:
    - a. Challenges facing younger faculty relative to promotion and tenure; perhaps focus on most senior scientists to engage in early large TR efforts
    - b. Include TR in annual reviews of faculty

- c. Recognize excellent TR projects for the campus; reward it and make explicit its value
- 3. Support seminars that bring faculty together and invest in speakers that can facilitate greater understanding of TR
- 4. Provide salary release funds; “mini-sabbaticals” to pursue TR
- 5. Invest in key senior hires to support TR; hire some clinician-scientists; include in the faculty excellence program

*Do you need a mechanism to identify areas of clinical relevance that could be applied to your area of interest?*

- 1. Establish Office of TR in VCR’s office or at the university level to promote TR
  - a. Identify individuals; opportunities; provide start-up funding and serve as an information source, catalyst and support structure as groups form
- 2. Identify institution that can serve as a “model” for our campus to move forward in TR
  - a. What has made them successful?
  - b. What can we learn from them?
- 3. Strengthen clinical relationships with Carle and other medical systems such as Mayo Clinic

*To move forward should we build on existing strengths or invest in new areas?*

*What are our existing strengths? If we pursue new areas, what are the opportunities? Is it feasible to pursue these opportunities?*

Campus strengths that were identified were:

- 1. Strengths in knowledge creation and sharing
- 2. Strengths in information technology and information systems such as PRAIRIE NET; Survey Research Laboratory
- 3. Extension service has strong infra-structure that could be utilized as a resource
- 4. Carle Hospital and its 40 hospital network; branch clinics
- 5. Access to rural areas and rural location
- 6. Chicago as large metropolitan area

Areas/themes discussed were:

- 1. Aging
- 2. Prevention and health maintenance; wellness
- 3. Rural health care challenges
- 4. Breast cancer

**BIOSENSORS AND DEVICES FOCUS GROUP WORKSHOP**  
**Monday, February 7, 2005 1-3pm Beckman**

Discussion Leader: Bruce Wheeler,  
Co-Leader: Al Feng

Attendees: Thomas Eurell, Assoc. Prof, Vet Biosciences  
Brian Cunningham, Assoc. Prof. ECE  
Myung Kim, Kim Labs  
David Gross, Prof. Vet Biosciences  
Alex Scheeline, Prof., Chemistry  
Ken Suslick, Prof. Chem  
Michael Strano, Asst. Prof. Chem Eng  
Mark Shannon, Prof. MIE  
Chang Liu, Assoc. Prof. ECE  
Jonathan Sweedler, Prof. Chem  
Phillip Best, Prof. MIP  
Hyungsoo Choi, Research Prof. ECE  
Doug Jones, Prof. ECE  
Kevin Kim, Prof. ECE  
Paul Shelton, Carle  
Scott White, Prof. AE  
Irfan Ahmad, Assoc.Dir, Nanotech Center  
Boris Odintsov, Rs.Prof. Beckman Imaging Center  
Ilesanmi Adesida, Director, Micro Lab  
Weng Chew, Prof. ECE  
Pierre Wiltzius, Director, Beckman  
Peter Bajcsy, NCSA  
Nancy Sottos, Prof. Beckman  
Hank Wilkenson, NRES  
Mark Mikel, Assoc. Dir. Biotech Center  
Kent Choquette, Prof Micro & Nanotechnology  
Mike Insana, Prof. Bioeng.

The Biodevices and Biosensors Workshop participants identified the following themes:

- Networking and Improved Communication:
  1. There was much interest in being able to make contact with physicians to learn of bed to bench side transfer needs. For this, life scientists can serve as the conduits.
  2. Suggestions included a dedicated website that can provide “computer dating” service in technical areas, workshops, group meetings, access to Carle physicians (e.g., creation of adjunct appointments for MDs in life science departments), creation of a consortium of scientists/engineers/clinicians

- Support for Translational Research:
  1. Seed funding – emphasis on more \$, more often, faster turn around
  2. Mention was made of competitions in targeted areas
  3. Upgrade and augment bio facilities (e.g., mouse transgenic)
  4. Provide short-term research space
  5. Provide time off (e.g., one semester off) for faculty to conduct TR
  
- Experience:
  1. Faculty in attendance included several with experience in commercializing bio-sensor etc. technologies
  2. There are some spin-offs in Champaign-Urbana
  
- Expertise Issues: - This group had lots of engineering expertise; smaller numbers of chemists and life scientists
  
- Strategies:
  1. Go with strength
  2. Build links to one or more of major hospitals, e.g., Mayo, Washington U, Carle, UIC

**HOST MICROBE INTERACTIONS FOCUS GROUP WORKSHOP**  
**Tuesday, February 8, 9-11am, Chemical Life Science Laboratory**

Discussion Leader: Charles Miller  
Co-Leader: Lawrence Schook

Attendees: Christopher Rao, Asst. Prof. Chemical Engineering  
Cheryl Schraeder, Associate Prof. College of Nursing  
Lois Hoyer, Associate Prof., Veterinary Pathobiology  
Brenda Wilson, Associate Prof., Microbiology  
Richard Tapping, Asst. Prof., Microbiology  
Joanna Shisler, Asst. Prof., Microbiology  
James Morrissey, Prof., Biochemistry/COM  
Wilfred Van der Donk, Assoc Prof., Chemistry  
James Slauch, Associate Prof., Microbiology  
Gay Miller, Prof., Vet Pathobiology  
Matt Stewart, Asst. Prof., Vet Clinic Medicine  
Eric Vimr, Prof., Vet Pathobiology  
Stephen Farrand, Prof., Microbiology  
Carol Maddox, Associate Prof., Vet Pathobiology

The group seemed to agree that there are significant opportunities for successful translational research activities in this area and that this is an area of strength for the campus.

**Needs for encouraging and facilitating translational research:**

- Support for pilot studies:

It was pointed out that it is difficult to obtain NIH support for pilot studies that might provide a foundation for translational research projects. There was a discussion of the CRI process, which can serve as a vehicle for the support of translational research. In response to a question, Jennifer Eardley stated that translational relevance has not in the past been considered but has now been added as an element of the evaluation of these proposals. Not all will be awarded on this basis but relevance to the development of translational efforts will be considered in evaluating proposals. It was noted that animal studies in particular are expensive but underlie many potentially translational projects. There was some sentiment that it would be useful to develop a process by which campus support for pilot studies could be obtained more rapidly than through the CRI program.

- Establishment of more clinical interactions:

*Access to clinical materials (e.g., tissue samples).* Several attendees reported that they have been able to develop relationships with Carle that provided them clinical materials. All agreed that the process was difficult, however, and should be improved by better cooperation between the university and Carle on such matters as standardized applications and protocol approval processes.

*Input from clinicians on possible applications of basic work and general availability of clinical perspectives and expertise.* Some of this may come in the form of increased interactions at the local level, e.g., by identifying and developing relationships with clinicians in the local environment who are interested in research. The employers of these physicians will have to recognize the value of such activities to make this a realistic possibility but there are indications that this may be possible. Some will have to come by making contacts with academic medical centers elsewhere. There was little evidence of meaningful interactions with UIC. Maybe the RTRC will offer some opportunities in this area. There was not a consensus on the need for hiring physician-scientists as faculty members although this obviously offers opportunities if the right people in the right areas can be found.

- Better lines of communication:

There was a feeling that the groups of people on the campus who could form synergistic interactions in translational work are not in good communication with each other. Several attendees suggested that a program designed to getting the people who are already here talking to each other might provide real benefits.

- Improved infrastructure support:

*Animal facilities.* Animal studies provide a key bridge between basic discoveries and clinical applications. Additional animal space including especially transgenic mouse facilities and facilities for large animal work are needed. There seemed to be a strong interest in animal models as an appropriate way for this campus to strengthen its translational capabilities.

*Biocontainment facilities.* The construction of biocontainment facilities at the BSL3 level is necessary in order for many investigators in the host/pathogen field to pursue translational opportunities.

*Electron microscopy and other state of the art visualization modalities.* There was a general feeling that the em capacity of the campus is woefully inadequate and that the MRL does not provide suitable resources for most biological work.

*Chemical synthesis and structure determination.* It was suggested that many basic research discoveries lead to the need to synthesize small molecules as inhibitors of potential drug targets. This kind of routine synthesis activity is unlikely to be attractive to our organic chemists. The possibility that high throughput screening should be available on a service basis was also discussed. It was suggested that the services available in this area should be based on a pharmaceutical or biotech company model.

*Administrative services.* There seemed to be agreement that there is a need for an increased level of administrative support to facilitate translational work. Some of the activities that might be assumed by such a person or office might include:

Coordinating and facilitating interactions with the clinical world (e.g., making it easier to deal with other institutions in matters of IRBs, materials transfers, etc.)

Facilitating communication with the clinical world (e.g., if an investigator has an idea that might address a clinical problem who should she/he talk to)

Facilitating communication among on campus worker with translational interests (seminar series, “dating service”)

Dealing with IP issues

- Issues related to nontenured faculty:

Young faculty may be reluctant to commit precious startup funds to translational work which is viewed as risky. Participation in translational work frequently involves multiple investigators in more than one department so it is unlikely to be positively recognized in the promotions process. There is no mechanism in current campus promotions procedures to provide input from on-campus sources concerning participation in interdisciplinary research groups. There is a pervasive sentiment among younger faculty that it is dangerous to get involved in collaborative projects. This is a significant concern that should be addressed.

**BIOIMAGING WORKSHOP FOCUS GROUP WORKSHOP**  
**Tuesday, February 8, 2005 3-5pm Grainger Engineering Library**

Discussion Leader: Bruce Wheeler  
Co-Leader: John Katzenellenbogen

Attendees:

Stephen Boppart, Asst. Prof, ECE  
Mark Oyama, Asst. Prof. Vet Clin. Sciences  
Thomas Eurell, Assoc. Prof. Vet Biosci  
JoAnn Eurell, Assoc. Prof, Vet Biosci  
Cheryl Schreder, Assoc Prof., Nursing and Director Carle Research Center  
Michel Bellini, Asst. Prof, CSB  
Michael Strano, Asst. Prof, Chem Eng  
Phillip Best, Prof, MIP  
Edward Roy, Prof, COMed  
Kevin Kim, Prof. ECE  
Vladislav Toronov, BIC  
Luisa Ciobanu, BIC  
Brad Sutton, BIC  
Yoram Bresler, Prof. ECE  
Zhi-Pei Liang, Prof., Bioengineering, Beckman  
Joe Lyding, Prof, ECE  
Adrienne Perlman, Prof. Speech and Hearing Science  
Michelle Wang, Asst. Prof. Statistics  
Leon Frizzel, Prof. ECE  
David Kuehn, Prof. SHS  
Matt Stewart, Asst. Prof. Vet Clin Med  
Boris Odintsov, BIC  
Gabriele Gratton, Prof. Psychology  
Doug Jones, Prof, ECE  
Munir Nayfeh, Prof.  
Scott Morris, Assoc. Prof., Ag & Biological Eng  
Bob Clegg, Prof. Physics

The Bioimaging Workshop participants identified the following themes:

- Improved Communication:
  1. “Dating Service” and “Match Making” – bulletin boards; web sites; listings of needs, skills
  2. Seminars – e.g., Carle physicians give UIUC departmental seminars; what other mechanisms exist to give exposure to medical problems?
  3. Better intra-UIUC communication – e.g. use one departmental seminar per semester for an out of discipline talk

- Support for Translational Research:
  1. Seed funding – emphasis on more \$, more often, faster turnaround
    - a. TRI funding lower levels – multiple times per year -
  2. Seed funding for testing in animal models
  3. Short-term space for starting, piloting TR activity – at Carle? Rentable space?

Engineers need intermittent access to biological lab space

Beckman lacking wet lab space

Mixed use biological building – bioengineering, biophysics, MCB, chem
  4. Short/medium term support for students at target institution (e.g. Chicago, St Louis, Mayo; C-U for collaborators’ students)
  
- Joint physician / scientist hiring:
  1. Opportunities exist to work through the culture/funding mismatch between UIUC and Carle/Provena
  2. First attempts have been successful
  
- Facilities Issues:
  1. Supporting high cost imaging (e.g. MRI): how to balance low per hour rates for development/engineering/basic science (e.g .NSF) and higher rates for clinical/preclinical usage (e.g. NIH)
  
- Expertise Issues:
  1. Expansion in biomolecular part of bioimaging refers to same expertise as targeted drug delivery, and other areas
  2. Need to compensate for faculty losses in MR, photonics
  
- Strategic Issues:
  1. Often bioimaging research can skip animal trials in pathway to clinical application
  2. Proximity to clinical expertise is very important (footnote: nearby physical location of a research hospital does not guarantee this)
  3. Increasing interactions with all appropriate translational targets is important (Carle/Provena; Mayo; Wash U; UIC; Riley)
  4. Some support for “putting med school on the table”

- Carle specific suggestions:
  1. Create a Department of Biomedical Research at Carle with a wing for research; good for publicity, incubation; rotating occupants
  2. Expand physician / scientist / faculty opportunities, including research residency program – there is an unusual opportunity to attract new MD/PhDs who otherwise will have to delay research by 3 to 7 years – good for long term faculty hires at UIUC, good for visibility
  3. Need a Pharmacology Department to be involved in Phase 1,2,3 clinical trials
  4. Make the breast cancer initiative work
  
- Building on Strength:
  1. We have many strengths – obviously in the sciences and engineering, but also in opportunities at Carle
  2. There are examples of successful translational research taking place on campus
  
- Areas of Opportunity:
  1. The group did not offer concrete suggestions as to broad areas of opportunity

**THERAPEUTIC AGENTS/DELIVERY SYSTEMS FOCUS GROUP WORKSHOP**  
**Wednesday, February 9, 2005 3-5pm Grainger Engineering Library**

Discussion Leader: John Katzenellenbogen  
Co-Leader: Martha Gillette

Attendees: Peter Constable, Prof., Head VCM  
Dan Pack, Asst. Professor, Chem & Biomolec Eng  
Russ Jamison, Prof., Bioengineering  
Joan Jorgensen, Asst. Prof., Veterinary Biosciences  
Paul Hergenrother, Asst. Prof., Chemistry  
Ken Suslick, Prof., Chemistry  
Huimin Zhao., Asst. Professor, Chemical and Biomolecular Engineering  
Paul Cooke, Prof., Vet Bioscience  
Edward Roy, Prof., Pathology  
Brad Schwartz, Prof., Dean of Medicine  
Hyungsoo Choi, Research Prof., ECE  
Raven Huang, Asst. Prof., Biochemistry  
Kevin Kim, Prof., ECE  
Wilfred Van der Donk, Assoc Prof., Chemistry  
Boris Odintsov, Research Prof., Biomedical Imaging Center  
Gerald Wong, Materials Science & Engineering  
Trudy Kriven, Materials Science & Engineering  
Bill Helfarich  
Roger VanHoy, Tech Mgr., OTM  
Yi Lu, Prof., Chemistry  
Bruce Wheeler, Head, Bioengineering  
Cindy Frasier, Carle Research Dept.

The **Therapeutic Agents/Delivery Systems Workshop** participants identified the following themes, needs and possible solutions.

**A. Improved Communication**

Participants expressed frustration with identifying colleagues on-campus, intra-city, and in regional clinical settings, with methodological, intellectual, translational expertise they seek. There was agreement that we need to work from the faculty up, not Campus down.

***Approaches and Possible Solutions***

- *Intra-Campus/Intra-City Communication* – know fully what types of translational collaborations might be possible on the UIUC campus (e.g., individual labs, College of Veterinary Medicine; Carle Foundation Hospital). Seminars/Med Scholars at Carle, esp., via the Breast Cancer Institute.

- *Inter-Institutional Communication* – e.g., with UI-Chicago, Washington University, Mayo
- *Basic Science-Clinical Science Communication* – A forum or web registry for basic scientists to showcase their research having translational potential, as well as methodological and intellectual areas on expertise, physicians and physician scientists to outline current and future medical needs, others who are in a position to facilitate translation (animal testing, pharmacokinetics, toxicology, etc.)
- *Point-to-point communication* – through colleagues, professional societies, attending meetings outside of a core (basic) science area to interact with academic and industrial colleagues whose interests, expertise, and needs might complement those of the individual investigator on this campus.

## **B. Support for Translational Research**

Participants expressed concern about how to support such new research. Considerable discussion was directed at the most cost-effective ways to make the transition into translational research.

### ***The Issues and Examples***

Small molecules, engineered proteins, and micro fabricated or nanodevices with potential medical application as therapeutic or diagnostic agents are frequently the product of research in the chemical, life, and engineering sciences, but it is not apparent how they might be tested on campus to evaluate their true potential.

In many cases, the production of these agents was funded through projects that claimed an ultimate medical use or benefit would ensue, the final delivery of which proves to be the most difficult.

### ***Approaches and Possible Solutions***

1. Seed funding – emphasis on more \$, more often, faster turnaround.
2. Develop mechanisms for small animal testing facility on campus, although negatives were raised
  - Formal research service facility [Vet Med; transgenic animal facility; small animal pathobiology]
  - Collaborative assistance by simple short-term funding of animal testing [With a simple application, Prof A can get seed money to test Prof B compound/device to assess potential for further collaboration or joint funding applications]
3. Value of joint physician/scientist hiring was discussed.
  - »Opportunities exist to work through the funding between UIUC and Carle/Provena
  - »

Many thoughtful and helpful comments were presented at the meeting. These can be summarized under four sections below. Other material has been attached, as well as comments from Steve Boppart]

## **I. Improve Communication within Campus and Between UIUC and Local and Regional Medical Units**

### *The Issues –*

There are individuals on campus with some natural synergy of expertise that would potentially facilitate research translation [faculty with interesting compounds, sensors, models to be used in studying or treating diseases; faculty with interesting disease models looking for treatments or reagents to facilitate studies] who do not know one another. Bringing them together would be a simple way to improve the effectiveness of research translation. There is a paucity of exposure of basic scientists to clinical problems and of clinicians to the products of basic science research.

### *Components of a Solution –*

- VCR Office could create an organized website on translational research (“dating service”) where faculty and staff could register their expertise and needs in biomedical technologies and testing thereby providing an opportunity for synergistic connections to be made
- This website would help campus researchers interested in developing multi-investigator program project applications of a translational character for federal funding. It could also function as a communication nexus for collaborative efforts with UIC, Mayo, or Washington University Med.
- Departments could adapt seminar series to include “cross fertilization” across the technology/applications interface; include research-interested clinicians at Carle, Provena. [others?]
- Develop joint Carle-UIUC research space, perhaps in Carle as part of a Department of Biomedical Research which might function as a “Translational Research Incubator” on a business-type model [Boppart suggestion]

## **II. Develop Facilities, Enhance Faculty Expertise, and Develop Educational Programs**

### *The Issues –*

Providing a convenient mechanism to do preclinical small animal testing of the efficacy and/or toxicity of therapeutic or delivery agents in animal models would facilitate translational research and greatly increase the commercial value of new entities. New compounds tested only in vitro and in cell culture are of little interest to industry, unless it is clear that development risks can be assessed.

### *Components of a Solution –*

- There are three models to accomplish this testing:
  - Campus **research service** to do small animal testing (as part of the Biotechnology Center? Transgenic animal facility?) – Expensive to set up and challenging to manage, but could be partnered with an expanded educational thrust in small animal models. Potential role of the College of Veterinary Medicine
  - **Facilitated outsourcing** – Arrangement to do small animal testing through contract to a commercial laboratory. A university office could act as an information and communication center.
  - **Facilitated collaboration** – Small grants program to do animal testing of new compounds; restricted to translational research, with relatively small funds available by competition several times per year. (Through the Research Board?)
- Expanded faculty expertise in animal physiology, pharmacology, and pathology. If animal testing is to develop as a campus research resource, it would only flourish if there were knowledgeable faculty interested in developing and overseeing its management. This might best be done through the creation of new faculty hires in relevant areas.
- [See below for other approaches to increasing faculty expertise in translational research on campus through cooperative hiring between UIUC University Departments and the College of Medicine, a “Research Residency Program”.]

### **III. Reduce Regulatory Burden**

#### *The Issues –*

Regulatory burdens in terms of developing animal and human use protocols have become so complicated that they pose a very significant impediment to any potential translational research involving animal experimentation. This is a serious, pervasive problem that is essential to address.

#### *Components of a Solution –*

- Generic animal use protocols that would enable various compounds to be tested in standard animal models without extensive revision or amendment of protocols for each new model need to be developed
- A top-down review should be made of the impact that the burdensome compliance system currently in effect has on research productivity
- An assessment should be made of whether a consortium of Midwest universities might collaborate in negotiations with federal regulatory bodies to facilitate compliance with minimum burden on the researcher
- Further work should be done on the development of human use protocols with Carle and other local medical groups.

#### **IV. Develop Creative Career Paths and Faculty/Clinician Hiring Plans that will Increase Individuals whose Activities Include both Research and Clinical Care/Medicine**

##### *The Issues –*

There is a paucity on campus of basic scientists who understand the details and nuances of clinical research and a paucity of clinicians in the community medical groups who have the knowledge and time to engage in research.

##### *Components of a Solution –*

- Cooperation between UIUC and the local medical groups regarding the hiring of clinician scientists who would have a portion of their time protected for research. Typically, this is a 80:20 clinical: research split, which is not enabling of substantial research involvement. The creation and funding of other models – 50:50 splits – should be explored. [Cooperate with Provena to develop a UIUC Research hospital by replacing physicians with physician-scientists – Boppart]
- Develop a “Research Residency Programs” cooperatively with local medical groups. This could be designed to attract new for MD-PhDs interested in continuing in research as postdoctorals or junior faculty that involve a much higher level than is typically permitted in residencies. Many MD-PhDs give up on research careers because they need to make a 3-7 year break from research to complete their clinical residency duties. Such a program would be nationally attractive and would build from the bottom-up a cadre of physician scientists engaged in translational research. [Steve Boppart’s experience provides is a model for how such a program might function; in fact, just such an opportunity was an important for him to come to this campus.]
- Campus units should increasingly avail themselves of opportunities to partner with the UIUC College of Medicine in their faculty hiring, to bring to campus new MD-PhD faculty and others who have a substantial clinical or medical dimension in their interest or experience.

##### **Other Thoughts:**

- Consider creation of an Office of Translational Research to provide campus wide oversight and guidance of the various components of a plan to enhance translational research on campus.
- Consider a multifaceted program in translational research as a program for new state funding.
- Try to develop translational research in a way that will not lead to conflicts with UIC, our sister institution, that is currently trying to develop translational research from the opposite direction [Boppart]
- Other ideas to facilitate multi-investigator collaborations with a translational dimension that would lead to new funding opportunities. This will be a key driver for the expansion of translational research.

[Attachment as Background Material]

#### **A. E-MAIL FROM STEVE BOPPART**

Bruce, John, Brad, and Herb,

It has been wonderful to see this interest and initiative in translational biomedical research, and thanks for leading this effort to collect ideas and input. I wanted to pass on some additional comments and thoughts that I've had regarding this topic. Obviously email is too cumbersome to go into details, but here are some briefs:

1. I agree that designating future hires to physician-scientists and physician-engineers would help to build a presence on campus that others would follow. Glad to hear Carle is so receptive to join UIUC with this.
2. Has there been discussion of UIUC having research space on the Carle campus? Proximity is everything and at least having space or a wing of "Department of Biomedical Research" goes a long way for public/hospital exposure, not to mention more productive clinical research. Perhaps use the Beckman model of rotating occupants with external reviews every 3 years. What about considering this a Translational Research Incubator with a business-type model?
3. In my mind, and I believe NIH's, Translational Research involves Phase 1,2,3 clinical trials. I've heard that one limitation at UIUC is the lack of a Department of Pharmacology. Can that be changed? Also, Carle's Cancer Center is very active in these clinical trials. It would be a nice show-case translational example to have something developed at UIUC under clinical trials at Carle.
4. I've mentioned to a few of you the idea of a strong "Research Residency Program", basically building up the program that I'm in right now. Our campus could lead the nation in this opportunity since there are so few available. The problem being...that MD-PhD graduates must typically abandon their research for 3-7+ years while completing their residency. In the end, they know medical practice and are less inclined to pursue research. The selling point would be to bring in MD-PhDs with the offer of a post-doc/instructor/Asst. Professor. position at UIUC and the opportunity to complete a residency. This builds the link with the medical establishment here and again adds to the type of faculty we wish to attract. It may be easier to attract young faculty with this, compared with trying to recruit senior faculty that may see us as too thin on clinical research.

5. Working out the conflicts with UIC will be critical. From my view, I see that UIC has the medical center, and is making a strong effort to build up engineering/sciences to have it all. I see UIUC with strong engineering/sciences and making an effort to build up the clinical side. I don't know if the U of I system or the state can support the build-up of both in parallel, but maybe this is the best solution to keep everyone at peace. I await to see what Pres. White will come up with.
6. I am hopeful that something big will come from the Midwest Breast Institute that Carle is initiating. There is a large amount of breast cancer and women's health research on campus. Could this be something that UIUC invests dollars/personnel in to work jointly with Carle? Carle does wish to have basic and clinical research be an integral part of this new Institute.
7. Hearing Brad's comments about how to think positive about the lack of a major academic medical center here has made an impression in my mind. Still, I believe we all agree that a larger infrastructure is needed. I've heard this idea mentioned by others as well, but would the conversion of Provena Covenant Medical Center into the "University of Illinois Covenant Medical Center" ever be a possibility? With recent troubles in management, personnel departure, and finances, perhaps Provena may have some incentive for a major change. Perfect location, and over-time, retiring physicians would be replaced with physician-scientists.

I'd be interested in hearing your thoughts, and continuing this discussion forward.

Thanks again for your efforts,  
Steve

## **B. NOTES USED TO FACILITATE DISCUSSION AT THE FOCUS GROUP ON THERAPEUTICS/DELIVERY**

Translation of basic research findings to the bedside would be facilitated by campus investments in four areas

### **I. Communication**

#### ***The Issues and Examples***

- A young scientist has prepared interesting compounds with potential anti-tumor activity does not know that several researchers on campus routinely work with tumor models in experimental animals who would be in a position to test these compounds.
- A senior researcher has developed elegant ways to target cells specifically to solid tumors, with potential diagnostic utility or therapeutic effects, is unaware that a well-known colleague has had a longstanding collaboration in imaging with a nearby medical center that could easily do preliminary testing of this technology.

#### ***Approaches and Possible Solutions***

- *Intra-Campus/Intra-City Communication* – know fully what types of translational collaborations might be possible on the UIUC campus (College of Veterinary Medicine; Carle Foundation Hospital)
- *Inter-Institutional Communication* – with UI-Chicago and Washington University
- *Basic Science-Clinical Science Communication* – A forum or web registry for basic scientists to showcase their research having translational potential, physicians and physician scientists to outline current and future medical needs, others who are in a position to facilitate translation (animal testing, PK, toxicology, etc.)
- *Point-to-point communication* – through colleagues, professional societies, attending meetings outside of your core (basic) science area to interact with academic and industrial colleagues whose interests, expertise, and needs might complement those of you and your lab.

### **II. Small Animal Testing Facilities and Collaborative Funding Incentives**

#### ***The Issues and Examples***

- Small molecules, engineered proteins, and microfabricated or nanodevices with potential medical application as therapeutic or diagnostic agents are frequently the product of research in the chemical, life, and engineering sciences, but it is not apparent how they might be tested on campus to evaluate their true potential.
- In many cases, the production of these agents was funded through projects that claimed an ultimate medical use or benefit would ensue, the final delivery of which proves to be the most difficult.

### ***Approaches and Possible Solutions***

- Develop mechanisms for small animal testing facility on campus
  - Formal research service facility [Vet Med; transgenic animal facility; small animal pathobiology]
  - Collaborative assistance by simple short-term funding of animal testing [With a simple application, Prof A can get seed money to test Prof B compound/device to assess potential for further collaboration or joint funding applications]
- Campus office charged with providing information and facilitating opportunities for testing elsewhere
  - NIH cell culture testing services
  - Contract Laboratories [IP issues]
- Possible role for
  - ORA – simple, “generic” testing/assaying agreements to protect UIUC IP
  - OTM – marketing UIUC IP for further development that would include animal testing with corporate entities

### **III. Expert Assistance in Animal and Human Use Protocol Development**

#### ***The Issues and Examples***

- The increasing regulatory control over research has made it functionally impractical of scientists to work outside of their narrow area of expertise. This is particularly acute with respect to the development of approved protocols for the testing of compounds, proteins or devices in animals and ultimately in people
- It is a challenge to maintain animal protocols, when they are rarely used in a project
- It is proving difficult and time consuming to develop human use protocols with Carle Foundation Hospital

#### ***Approaches and Possible Solutions***

- Campus office offering expertise in the development of approvable protocols for animal and human experimentation.
- Simplification of protocol development and approval

### **IV. Organize Campus Focus Areas to Develop (or Participate More Effectively with Other Institutions) in Multi-Institutional Program Projects**

#### ***The Issues and Examples***

- NIH Regional Translational Research Centers
- NIH Cancer Centers of Nanotechnology Expertise

#### ***Approaches and Possible Solutions***

- Office or Center to maintain a database and communication database of on-campus projects in areas of potential translational potential, with designated area leaders who can coordinate multi-investigator program applications.

**NEW DIRECTIONS FOCUS GROUP WORKSHOP**  
**Thursday, February 10, 2005, 9-11am, Grainger Engineering Library**

Discussion Leader: Herbert Whiteley  
Co-Leader: Bradford Schwartz

Attendees: Stephen Boppart, Asst. Prof., ECE/BioEng/Medicine  
Bruce Schatz, Prof., Library Information Sci  
Russ Jamison, Prof., Bioengineering  
Joan Jorgensen, Asst. Prof., Veterinary Biosciences  
JoAnn Cameron, Assoc. Prof., Cell & Structural Biology  
James Morrissey, Prof., Biochemistry/COM  
David Stocum, Prof., Cell & Structural Biology  
Bruce Wheeler, Head, Bioengineering  
Michael Insana, Prof., Bioengineering  
Thomas Dunning, Director, NCSA

The group decided that setting specific thematic directions would not yield the kind of effective programmatic movement desired without enabling changes in our culture. Two main areas were highlighted:

1. Translational research is by its very nature interdisciplinary. All the attendant problems that arise in a department based structure that result in the obstruction of highly functional and innovative interdisciplinary enterprises were again brought up. The group therefore recommends that the Provost appoint a blue ribbon committee of highly respected faculty members to address features of the promotion and tenure process that must be addressed to enable the long-term success of translational (and other forms of interdisciplinary) research.
2. An essential part of the intellectual infrastructure that enables translational research is the presence of physicians who also understand high quality research. The group understands that certain units on campus have greater cultural barriers to including physician investigators, while others would see the recruitment of such individuals as a real opportunity. The focus group recommends a campus commitment to recruit physician investigators (several models were discussed) with joint or affiliate appointments (whichever is appropriate for the given individual) between clinical departments and other units on campus. The focus group urges a consolidation and formalization of relationships with the hospitals and clinical groups to facilitate the recruitment of these individuals, and to help with funding of start-up costs and access to clinical material.

3. Rather than identify specific thematic areas of research, the focus group felt that playing to our strengths as a campus was important, and that communities of faculty members doing high quality related research would, if given the opportunity with structural changes to enable translational research, expand energetically into areas of the greatest promise and potential.
4. The potential relationship with the Mayo Clinic was discussed. There is enthusiastic support for continuing to explore possibilities in an expanded institutional collaboration.

**STEM CELL BIOLOGY FOCUS GROUP WORKSHOP**  
**Thursday, February 10, 2005 11-1 Grainger Engineering Library**

Discussion Leader: Lawrence Schook  
Co-Leader: Martha Gillette

Attendees: Cindy Frasier, College of Nursing  
Matthew Wheeler, Prof., Animal Sciences  
Matt Stewart, Asst. Prof., Veterinary Clinical Medicine  
Stephanie Ceman, Asst. Prof., Cell & Structural Biology  
Jie Chen, Assoc. Prof., Cell & Structural Biology  
Holly Nye, Research Assoc., Cell & Structural Biology  
JoAnn Cameron, Assoc. Prof., Cell & Structural Biology  
David Stocum, Prof., Cell & Structural Biology  
Jay Mittenthal, Assoc. Prof., Cell & Structural Biology  
Byron Kemper, Prof., Molecular & Integrative Physl  
William Greenough, Prof, Beckman/Psychology  
Allison Stewart, Asst. Prof., Vet Clinic Medicine  
Bruce Wheeler, Head, Bioengineering

The **Stem Cell Workshop** participants identified the following themes, needs and possible solutions. In general, this group focused less on mechanisms for developing translational research opportunities and more on the feasibility and focus of building stem cell and regenerative biology on our campus.

**A. Improved Communication**

Participants expressed frustration with identifying colleagues on-campus, and were surprised at the number of people attending the workshop who self-identified as interested in / working in stem cell and regenerative biology.

***Approaches and Possible Solutions***

*Intra-Campus Communication –*

Participants were encouraged by this discovery of new colleagues on campus and wished to meet regularly, at ~ 6-month intervals.

Larry Schook invited all of this group of stem cell/regenerative biology faculty to participate as affiliates in the IGB theme that he chairs on this subject. This may serve as a nexus for organizing fluid communication within this group.

A website, patterned after the Bioimaging Web Site, would provide a means for communicating expertise, technical needs, matchmaking for collaborative work.

## **B. Campus development in stem cell biology**

This was a major point of discussion. Participants expressed concern as to how the campus should invest in this area. This is not a new area of research, but is already well developed nationally and internationally.

- We should focus on what would distinguish us.
- There was agreement that focus on embryonic stem cells would not be as likely to distinguish us in the biomedical field, as this area has been developed for some time. Focus not on human embryonic stem cells, but rather on pluripotent post-natal cells. There was interest in developing large animal embryonic stem cell work.
- We could distinguish ourselves in areas such as:
  1. The interface of cells/tissues with biomaterials/substrates;
  2. Bridging life sciences – chemistry – engineering/biomaterials;
  3. Identifying extra cellular cues / intracellular signaling pathways that instruct differentiation in stem cells in the adult organism,
  4. Inducing tissue-specific stem cells to differentiate to regenerate tissue.
  5. Don't try to 'catch-up' with Wisconsin, Berkeley, MIT. Careful consideration should be given to further developing this list to identify where we can make the biggest impact. Leverage our strengths.
- Campus has interfaces with the U of Singapore: interest in devices to hold stem cells.

## **C. Support for Stem Cell Biology**

Individual participants expressed concern about Campus facilities and finding personnel with adequate training.

### ***Approaches and Possible Solutions***

1. There was discussion of the need of a resource person who is bone fide core stem cell biologist.
2. There was debate on the feasibility of re-establishing a Transgenic Animal Facility on our campus. Jie Chen recalled our loss of highly competitive faculty last year because of our lack of such a facility. Matt Wheeler stated that unless we had faculty generating ~100 animals/year, this was unfeasible.
3. Need was expressed by one individual for the capability to identify stem cells in tissue, perform pathological evaluation and track cells in tissue.
4. Possibility of developing a professional MS degree in Biotechnology was discussed. This could include training in tissue histology and sample preparation.
5. Value of joint physician / scientist hiring was discussed. Opportunities exist to work through the funding between UIUC and Carle/Provena.

## **MEDICAL INFORMATICS FOCUS GROUP**

**Friday, February 11, 2005 9-11am, Grainger Engineering Library**

Discussion Leader: Brad Schwartz

Co-Leader: Tanya Gallagher

Attendees: Bruce Schatz, Prof., Library Information Sciences  
Greg Youngen, Vet Med Librarian, University Libraries  
Gary Olsen, Prof., Microbiology  
Wen-Mei Hwu, Prof., Electrical & Computer Eng, Coord. Sci Lab  
Jiawei Han, Prof., Computer Science  
Peter Bajcsy, Asst. Prof., Electrical & Computer Eng  
Bruce Wheeler, Head, Bioengineering  
Laurie Talkington, Program Mgr, Coordinated Science

Initial questions: What is medical informatics?

1. Managing information about biological systems; requires – basic infrastructure, original research program & national impact
2. Many adjectives linked to informatics – reflects where the department came from
3. Informatics is a tool

Need to make decision to pick 2 or 3 big ideas as focus

1. Facilitate this with institutional support (e.g. Michigan)
2. NCSA could lead this effort – mission has to re-defined; need leadership & hiring of bridge faculty
3. Consider establishing “Center” as locus of the work Opportunity with NCSA would be mutually beneficial – valuable resource

Need organizational structure for the work

1. Need to determine how all components would work together – NCSA & departments
2. Culture needs to be addressed - consider hiring “research” professors
3. Invest funds in seeding these efforts