Developing Research Programs and Partnerships in Biomedical and Health Sciences

Dr. William T. Self

Dr. Mary Lou Sole

Dr. Karen Dennis

Dr. Kevin Belfield

Overview of Session

Dr. Belfield

Developing a Successful NIH Record

Dr. William T. Self
UCF Burnett School of Biomedical Sciences

First Questions to ask – Is NIH right for my idea?

- Are you qualified to submit a proposal as a PI?
  - Publication record
  - Institutional support (space, time)
  - Training (education, fellowship, faculty position…)

- Are you planning to do research in an area that the NIH currently funds?
  - NIH reporter (*project**reporter**.**nih**.gov/**reporter**.cfm*)
  - Current literature – how are other colleagues supported
  - Look at each institutes research areas (27 institutes)

Second step – Get Help!

- Seek a mentor who has a record of NIH funding
  - Colleague from your department, or from outside
  - Seek advice on whether the idea has merit – informally or based on an outline of your proposal
  - *HAVE A GOOD IDEA!!!* – You must generate real and sustained enthusiasm from all the reviewers in today's climate to champion you during the panel
- Read several successful proposals before writing yours – understand what components are present in the proposal and the format

Proposal Development

- Start early! – (4 months)
  - Establish a clear gap in our knowledge with literature review (clear need for applied research)
  - Define a very specific and clear HYPOTHESIS
  - Directly test this hypothesis (FOCUS!)
  - Be sure to describe in detail how you will test the hypothesis, and how you will interpret your data (whether it supports or refutes the hypothesis)
  - Realize that all the reviewers will have is your proposal – nothing else – they must get excited from just reading it (*make them wish they were going to do the work*)
- Have it reviewed by several colleagues *with plenty of time before the deadline*

Criteria for NIH proposals

- Significance (if the work is done….)
- Investigator (who you are, track record…)
- Innovation (new criteria…)
- Approach (hypothesis, design and interpretion)
- Environment (where you are – support – resources)

Any weakness in any area – can reduce score

Common mistakes

- Lack of compelling rationale to do the work
- Not viewed as significant work – or in line with current research priorities of the institute(s)
- Too little detail on experimental design or data interpretation
- Too ambitious (twenty years work of work…)
- Unfocused (repetitive argument with little detail)
- No discussion of what to do when the hypothesis is not supported (pitfalls)
- No evidence for track record (publications, collaborations, institutional support, expertise)

Project management

- Prioritize your research project(s) always thinking about proposals…..
  - What preliminary data would be necessary to generate a compelling case for funding?
  - Focus on research that is likely to be ‘fundable’ by NIH or some agency
  - Publication in many ways ‘validates’ your ideas to the reviewers – it is the foundation of a track record
  - Collaborate – but don’t change your stripes…

If not funded….☹

- Read critiques thoroughly with an open mind – How close were you? Can you respond well?
- Try to improve your proposal with new information/data – have others read the reviews
- Publish the preliminary data in a very good journal
- Have a thick skin!

- Target another panel? Another agency? – work with your mentor to have a good game plan for the next step

Establishing Partnerships in Acute and Critical Care

Dr. Mary Lou Sole
Orlando Health Distinguished Professor
UCF College of Nursing

YOU ARE CORDIALLY INVITED

2010 AACN DISTINGUISHED RESEARCH LECTURE

How I learned my ABCs:
Asking, Back to Basics, Collaboration, Discovery

Mary Lou Sole
PhD, RN, CCNS, FAAN, FCCM

Monday, May 17, 2010
2:15 pm
Washington Convention Center
Washington, D.C.

Funded by a grant from Philips Healthcare

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

PHILIPS

Challenges of Conducting Research in Acute and Critical Care

- Acutely ill patients
- Many treatments
- Changing physiological status
- Competing interests
- Varied health professionals providing care
- Consent

Research Resources

Academic Health Center

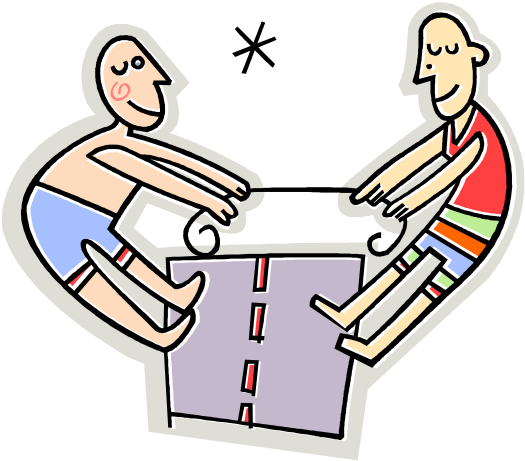
- Team members
- Varied disciplines
- Statistical and grant writing support
- Clinical research is common

Community Hospitals

- Ongoing search for resources
- Limited support
- Clinical research less common, especially that done by nurses

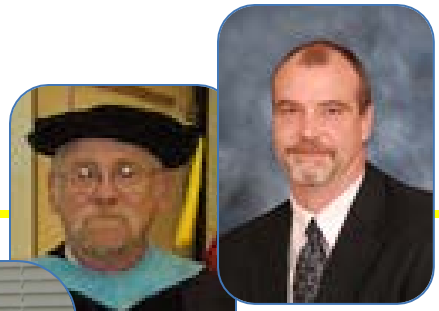
Action

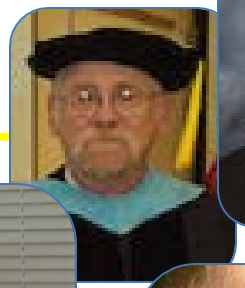
- Establish formal affiliation with hospital
  - Per diem positions
- Identify access to subjects
- Identify collaborators
  - Involve lots of people
- Establish relationships with IRBs
- Bi-directional give-and-take

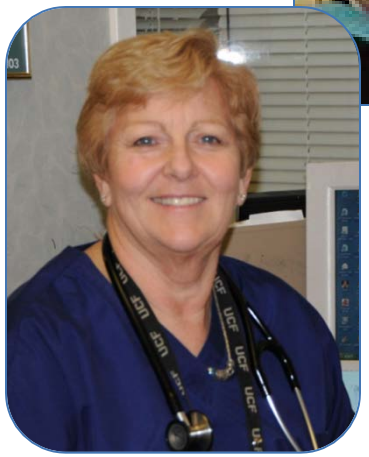


Action

- Build the team
  - Colleagues
  - Students
  - Other disciplines
  - Seek others (e.g., engineering)
  - Consultants







Team Building Example

Discipline	Individuals
UCF Nursing	Drs. Byers, Penoyer, Talbert
Respiratory	Dr. Ludy
Statistics	Dr. Su
Medicine	Drs. Jimenez, Cheatham, Vollenweider
Engineering	Dr. Kalita
Microbiology	Dr. Walsh
Speech	Dr. Ruddy
Orlando Health Staff	Ms. Bennett, Bertram, Hollandsworth, Blackburn, Mueller, Pearman
Students	Nursing and Respiratory

Back-to-Basics / Bedside

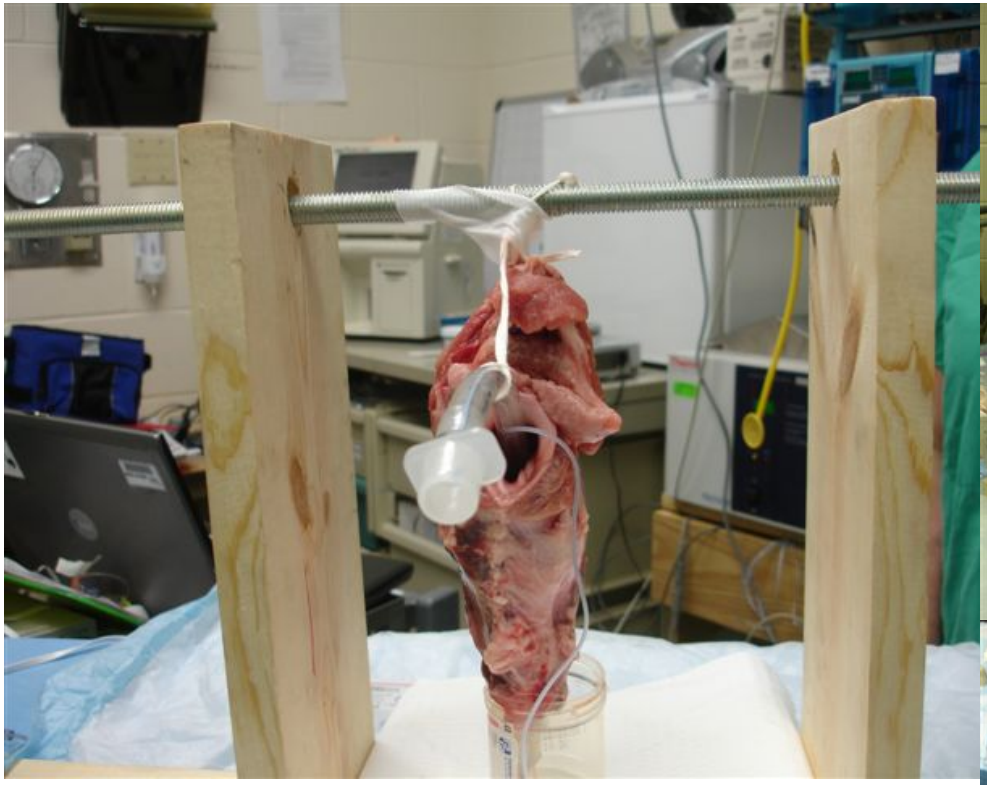
- ***What is best for the patient?***
  - ***Access helps to identify ideas***
  - ***Reassesses practical "will it work"***
  - ***Connects research and practice***

Collaboration

- Find collaborators across discipline
- Avoid the “lone researcher”
- Synergy in the research endeavor
  - Access to patients
  - Access to IRB
  - Ready approvals
  - Open doors

Collaboration

- Has also facilitated some interesting bench and animal research



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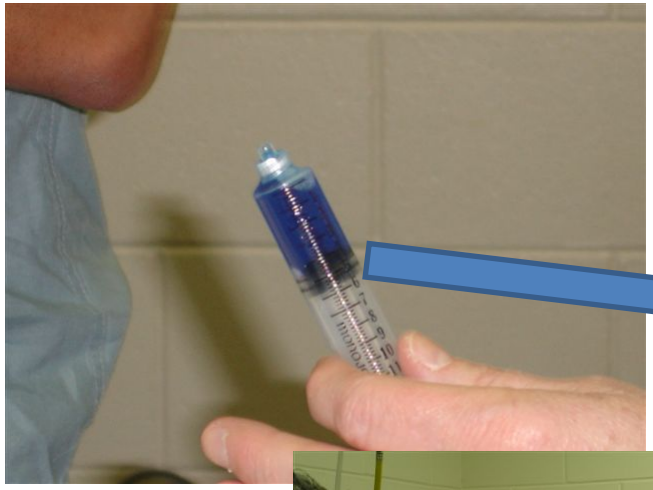
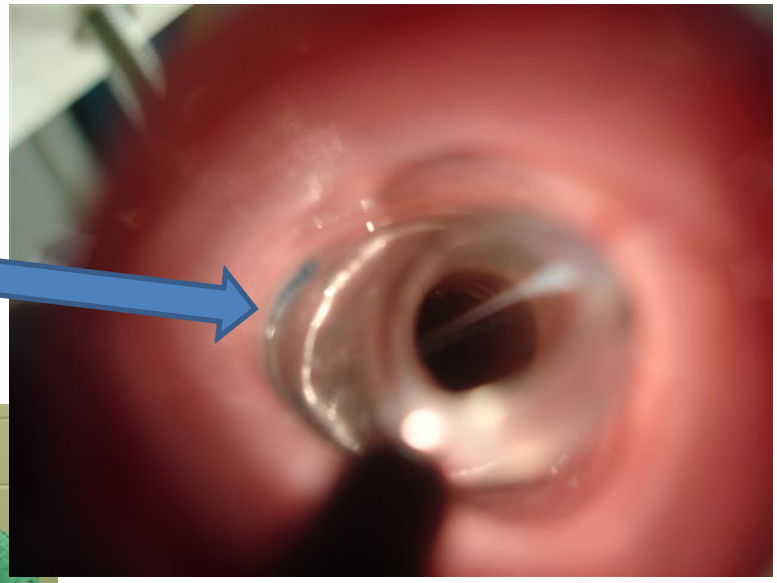
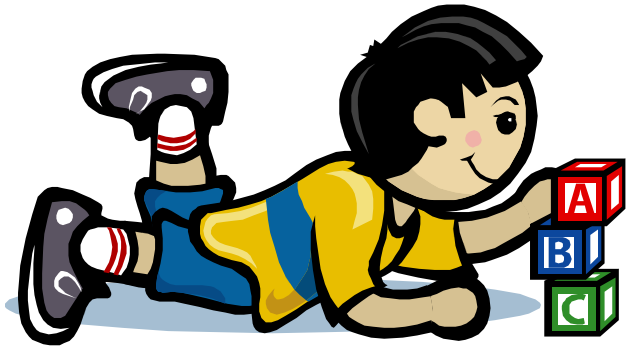




Success is as Easy as ABC

- **A**ct; **A**sk
- **B**ack-to-basics; **B**edside approach; **B**uild infrastructure
- **C**ollaborate; **C**onnect; **C**reate; **C**lever
- **D**iscover; **D**isseminate; **D**on’t accept failure



Partnerships in Community Based Participatory Research

Dr. Karen Dennis
Professor
UCF College of Nursing

CBPR Definition

- Interdisciplinary research methodology
  - Scientific professionals and members of a specific community
  - Work together as equal partners
  - In **all** phases of the research:
    - Development
    - Implementation
    - Dissemination
  - Relevant to the community

CBPR Principles

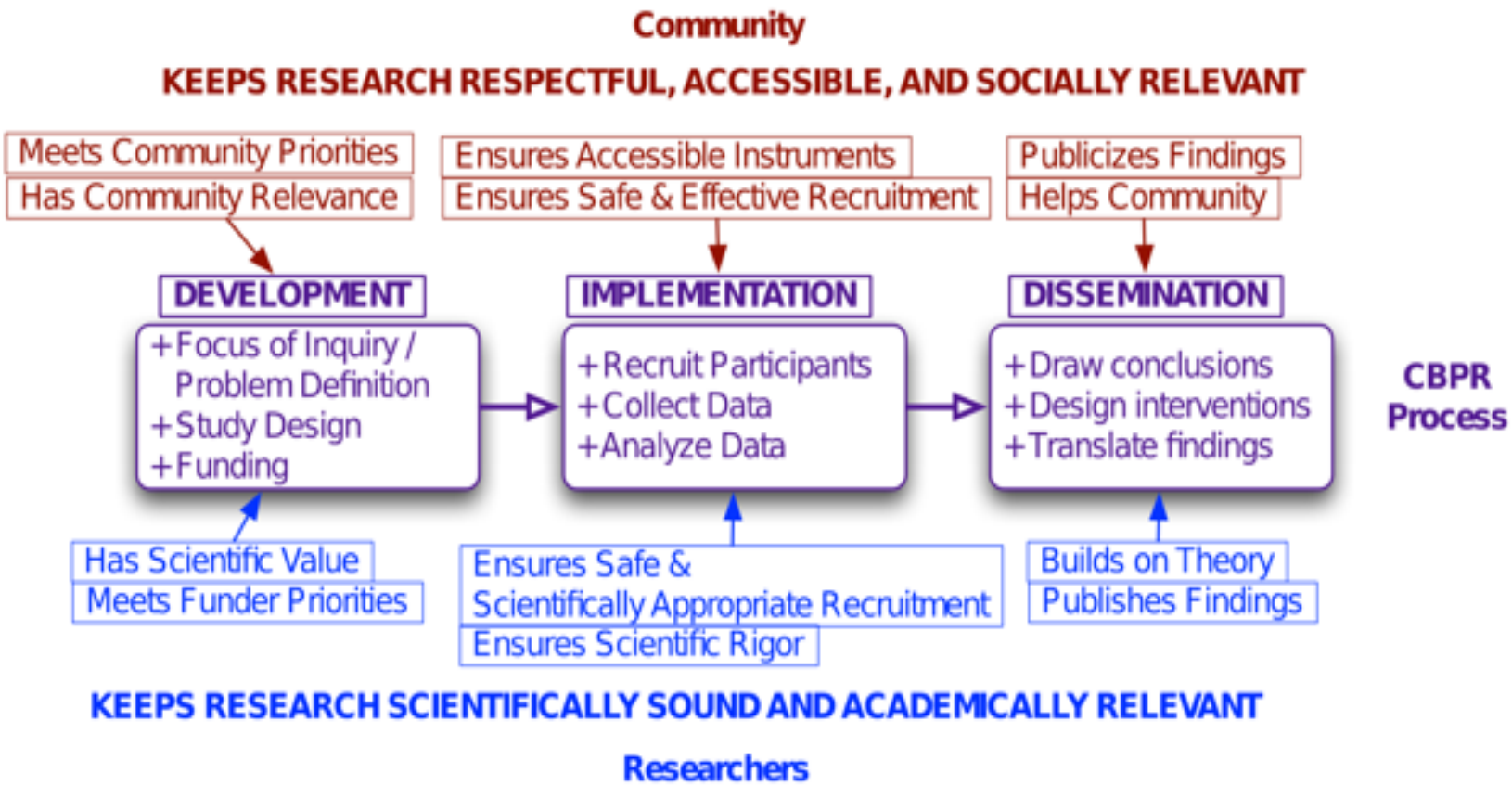
- Acknowledges community as a unit of identity
- Builds on strengths and resources in the community
- Facilitates a collaborative, equitable partnership in all phases of research

CBPR Principles

- Facilitates co-learning and capacity building among all partners
- Integrates and achieves a balance between knowledge generation and intervention for the mutual benefit of all partners
- Involves a cyclical and iterative evaluation and improvement process

CBPR Principles

- Focuses on community relevance that attends to multiple determinants of health and well-being
  - Physical Emotional Economical Social
- Disseminates results to all partners and involves them in the wider dissemination of results


Community
KEEPS RESEARCH RESPECTFUL, ACCESSIBLE, AND SOCIALLY RELEVANT
Meets Community Priorities
Has Community Relevance
Ensures Accessible Instruments
Ensures Safe & Effective Recruitment
Publicizes Findings
Helps Community
DEVELOPMENT
+Focus of Inquiry / Problem Definition
+Study Design
+Funding
IMPLEMENTATION
+Recruit Participants
+Collect Data
+Analyze Data
DISSEMINATION
+Draw conclusions
+Design interventions
+Translate findings
CBPR Process
Has Scientific Value
Meets Funder Priorities
Ensures Safe & Scientifically Appropriate Recruitment
Ensures Scientific Rigor
Builds on Theory
Publishes Findings
KEEPS RESEARCH SCIENTIFICALLY SOUND AND ACADEMICALLY RELEVANT
Researchers

CBPR Benefits

- Helps Community get its needs met through research that is actually relevant
- Helps investigators do more valid, quality research with respect to the Community

CBPR Benefits

- Helps to bridge gaps in understanding, trust, and knowledge between academia and Community
- Gets higher quality and more useful results by taking into account individuals' environment, culture, and identity
- Provides for empowerment of and equal control by people who have had little say in the research performed upon them or about them

Get Active Orlando

- Emerged from Active Living by Design
  - City of Orlando funded by RWJF
  - Projects Programs Policy

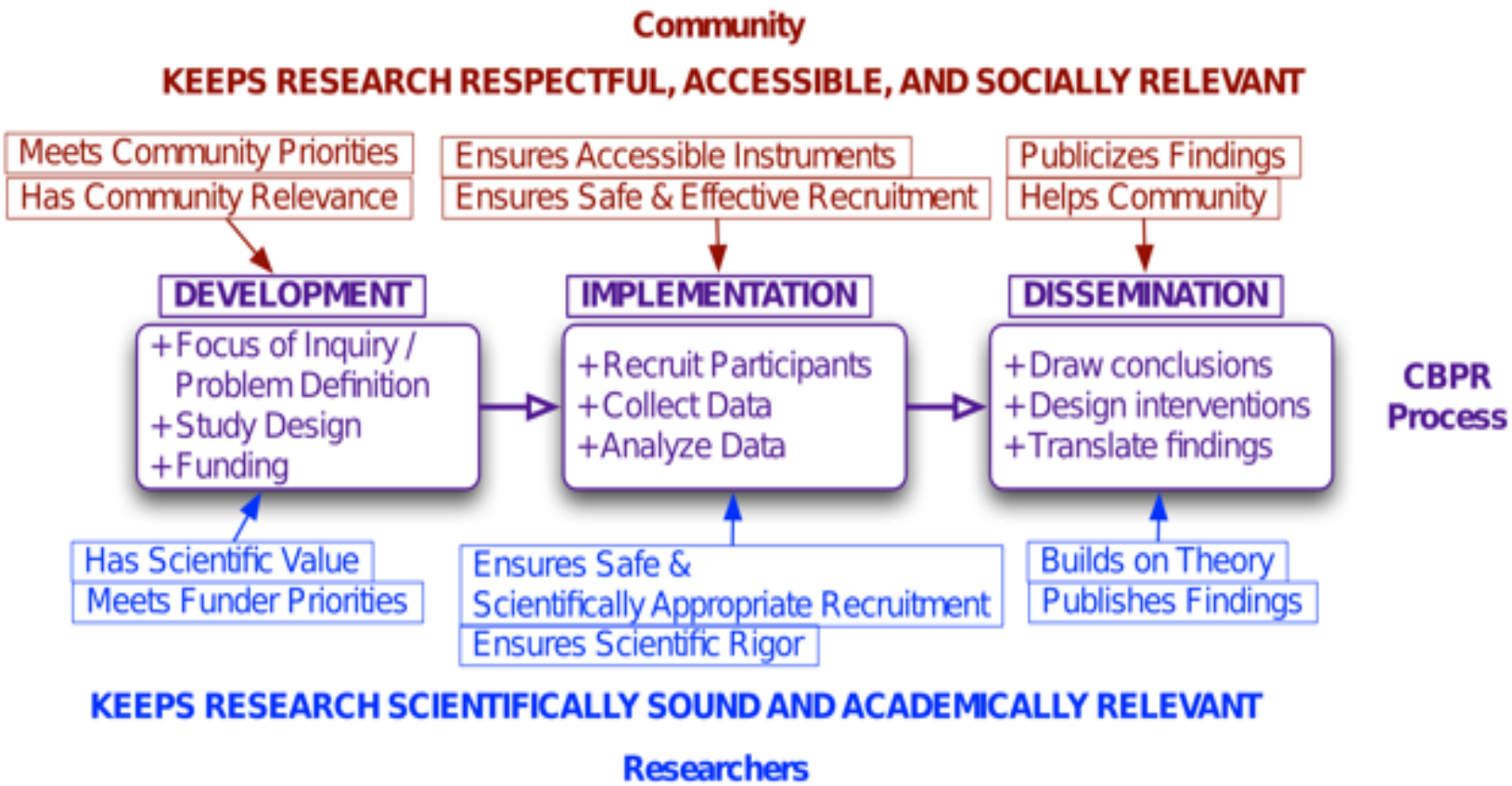
- Get Active Orlando – funded by NIH
  - Evaluation component of Programs
  - Walking
  - Bicycling
  - Community Gardening

GAO Partnership

- City of Orlando
  - Planning, Transportation, Police, Family Parks & Recreation, Leu Gardens
- MetroPlan Orlando
- FL Bicycle Association and Florida Freewheelers
- Orlando Neighborhood Improvement Corporation
- Parramore residents' homeowners association
- Johnson's Diner

GAO Partnership

- Orlando Regional Healthcare System
- Florida Hospital
- Orange County Health Department
- Nemours Health & Prevention Services
- Health Council of East Central Florida
- UCF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Researchers

Expanding Opportunities through Partnerships, Peer Review, and Interdisciplinary Connections

Dr. Kevin D. Belfield
Department Chair and Professor
UCF Chemistry Department

Set Long-term Research Agenda & Think Outside the Box

- Two-photon absorbing materials has been a primary theme of my research
- Realized at least 12 years ago the power of two-photon fluorescence microscopy for tissue imaging
- Began developing probes for two-photon fluorescence microscopy
- But this wasn't enough, needed to identify important problem to address
- Read, attend conferences in area where one wants to eventually present work
- Serve on NIH study sections – accept ad hoc invitations
- Formulate idea for probes for tumor angiogenesis imaging
- Submitted NIH proposal & fortunately was funded on 1st attempt in 2007 R15: **Two-Photon Fluorescent Probe Development for in Vivo Spatial and Temporal Angiogenesis Imaging**

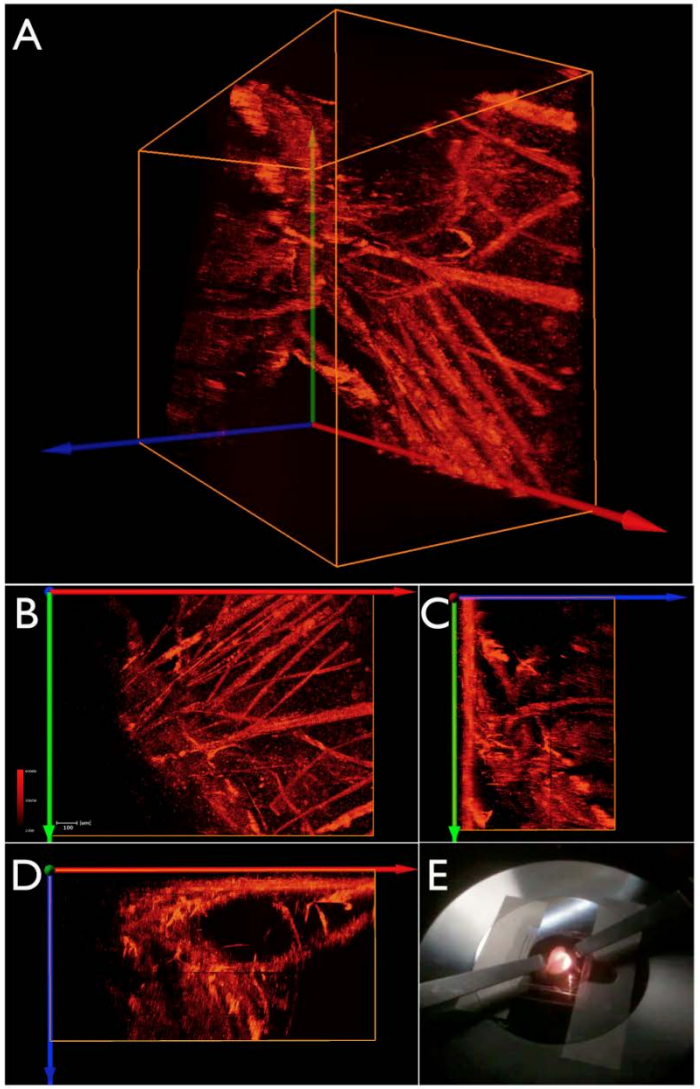
Seek Collaborations if Work is Interdisciplinary

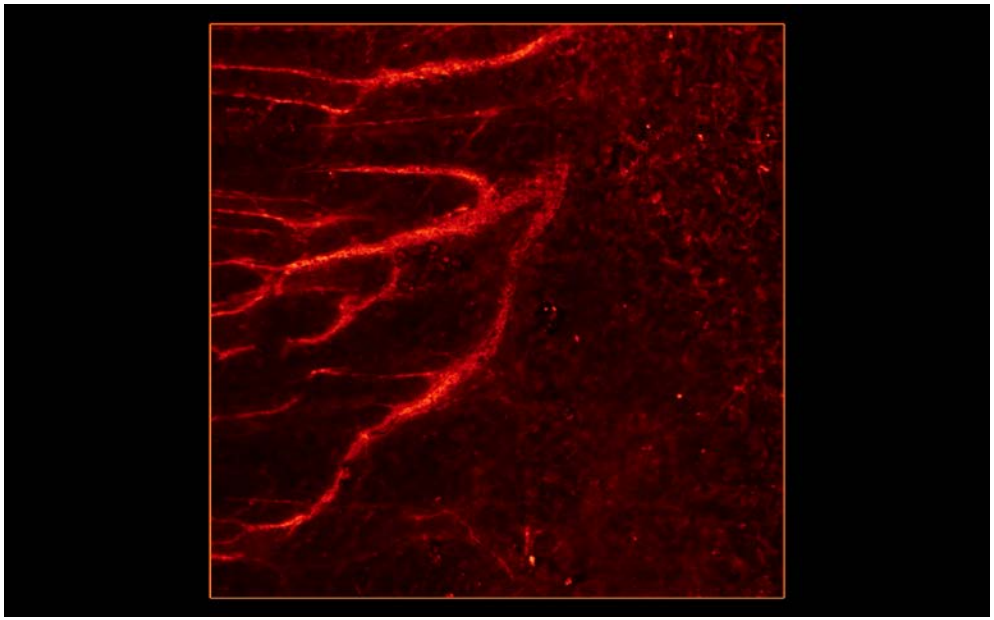
- Realized early that early on that collaboration with cancer cell biologist type of researcher was necessary
- Be prepared to do some of the interdisciplinary work in own lab to have a foundation for the collaboration
- We set up everything for in vitro cell culture work to get basic information on suitability of new probes, benchmark them against commercial probes
- In 2008, met Dr. Masanobu Komatsu of Sanford-Burnham who was studying tumor angiogenesis
- We realized how collaboration would be of mutual benefit – key, don't try to force an "unnatural" collaboration

Keep at it

- While we published our own efforts, the collaboration took time - culture, language, goals
- Three years later we are publishing results of our efforts & writing proposals
- Folate Receptor-targeted Aggregation-enhanced Near-IR Emitting Silica Nanoprobe for One-photon *in vivo* and Two-photon *ex vivo* Fluorescence Bioimaging published in **Bioconjugate Chemistry** in 2011
- Two-photon fluorescence vascular bioimaging with new bioconjugate probes selective towards the vascular endothelial growth factor receptor 2 published in **Bioconjugate Chemistry** in 2011
- Two more manuscripts going out, submitted R01 in October

Deep ex Vivo Tumor Vasculature Imaging





2PFM integrin imaging

International Opportunities

- U. S. Civilian Research & Development Foundation (CRDF)
- High Performance Fluorescent Probes for Multiphoton Fluorescence & FLIM Bioimaging awarded in 2008
- Mykhailo Bondar, Institute of Physics, National Academy of Sciences of Ukraine

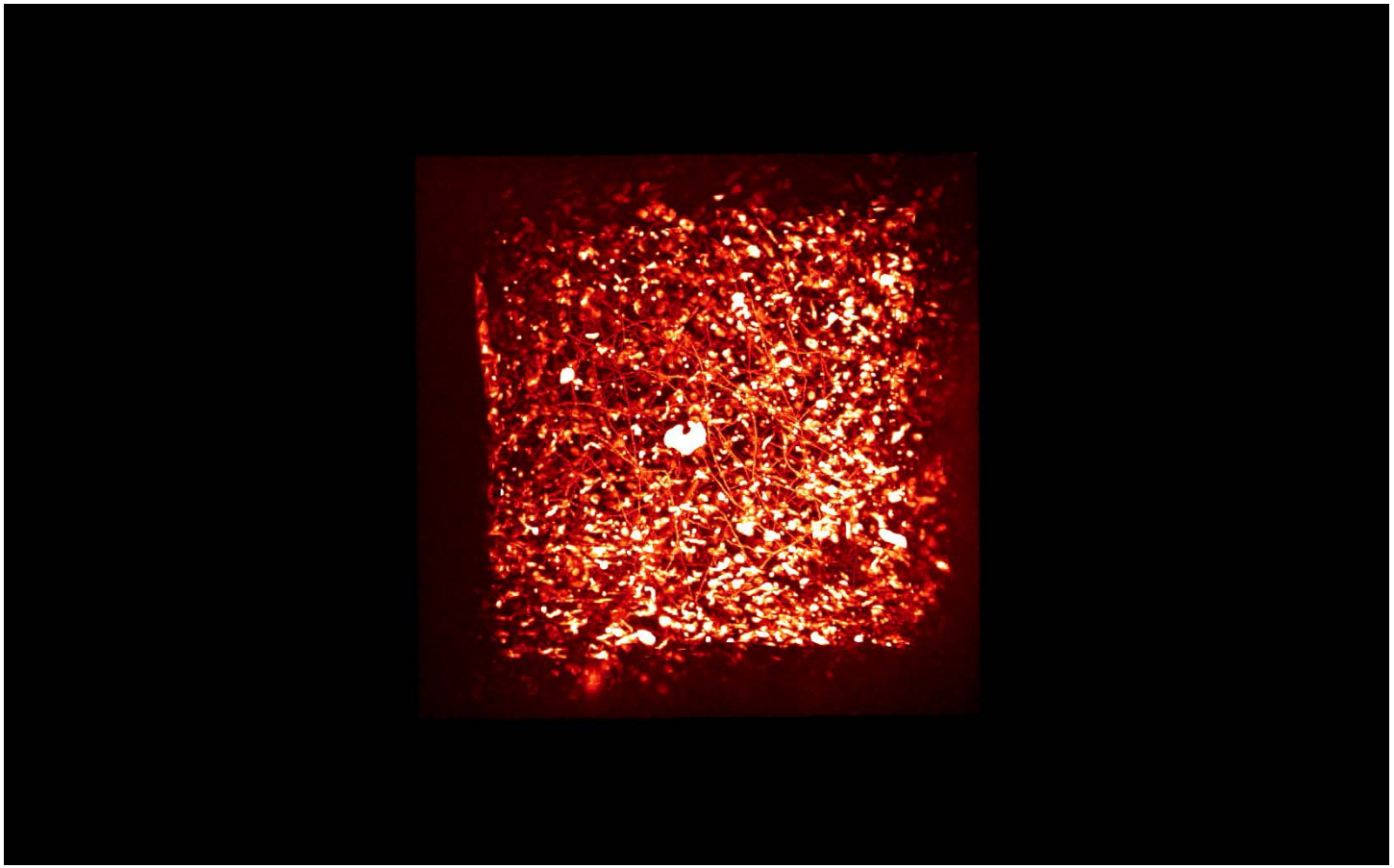
State of Florida Programs

- James & Ester King Biomedical Research Program – Postdoctoral Fellowship – Ciceron Yanez
- Synthesis & evaluation of small molecule photoactive Bcl-2 and Bcl-XL inhibitors for pro-apoptotic photodynamic lung cancer therapy
- Allows one to explore new directions and train postdoctoral researchers to accomplish goals of program

Produce & Deliver

- Important to demonstrate productivity
- Student training: 8 Undergraduates (including 6 female, 2 Hispanic); 2 High School Teachers (2 female both African American); 1 high school student (female); 9 PhD students graduated (3 female, 2 Hispanic); 3 Postdoctoral Scientists (1 female, 2 Hispanic)
- 25 papers and counting
- 1 US Patent

Deepest Two-Photon Fluorescent Vascular Imaging to Date (1.55 mm)



Angiogenesis imaging extends UCF/Sanford-Burnham collaboration to a group in Finland

Questions?

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