



Washington University in St. Louis

Transdisciplinary Center Approach to Examine Multilevel and Multigenerational Associations Between Obesity and Cancer

Graham A. Colditz, MD, DrPH
Sarah J. Gehlert, PhD

January 25-26, 2012
TREC Scientific Meeting

www.obesity-cancer.wustl.edu

Research Direction Across the Cancer Continuum and Life Course

Cells → Society

Basic science →

Clinical science →

Implementation →

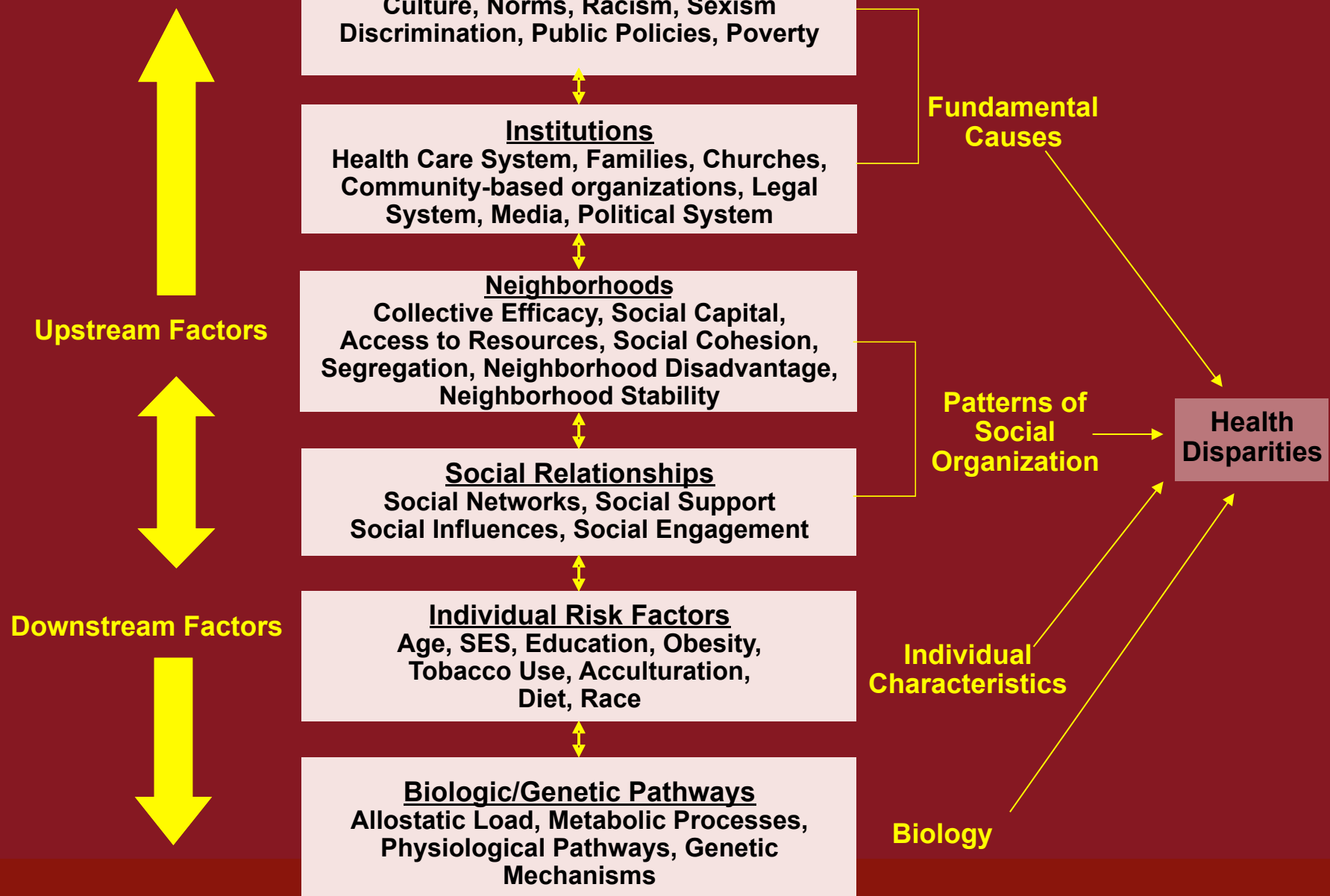
Policy



Transdisciplinary research on the link between obesity and cancer across the life course

www.obesity-cancer.wustl.edu

Source: Warnecke et al., *AJPH* 2008



Distance: A Barrier to TD Science

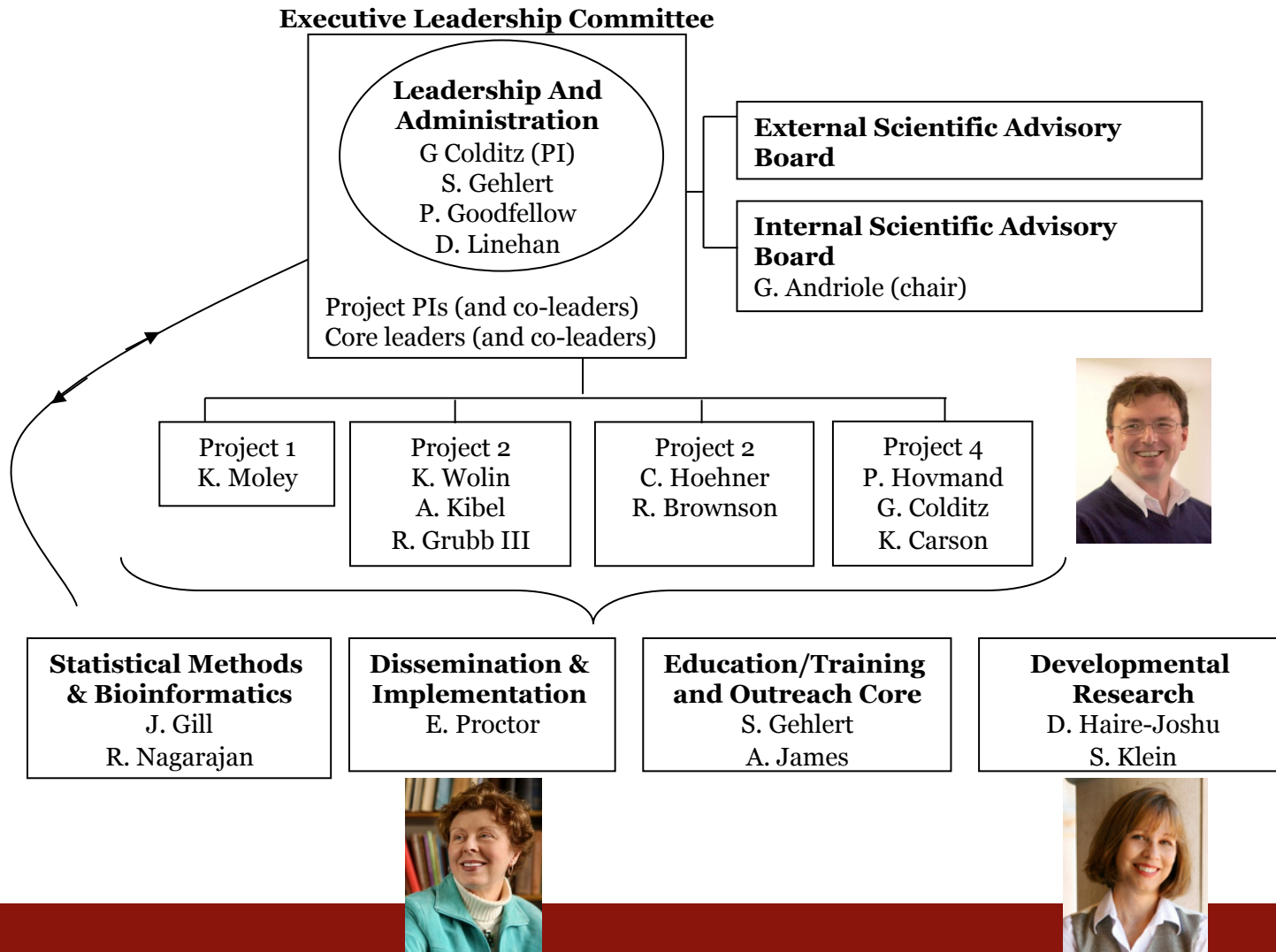
WUSTL Danforth Campus

WUSM Medical Campus

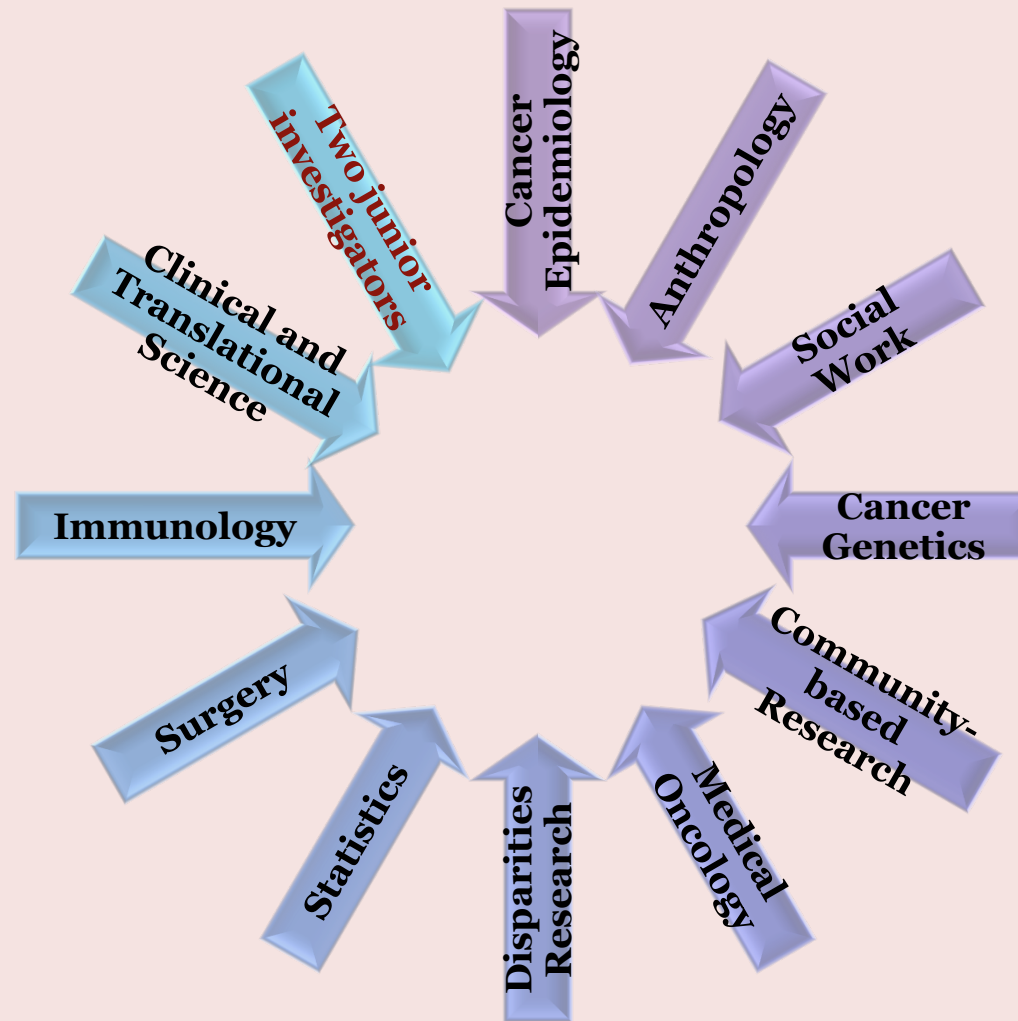
Forest Park
1,293 acres

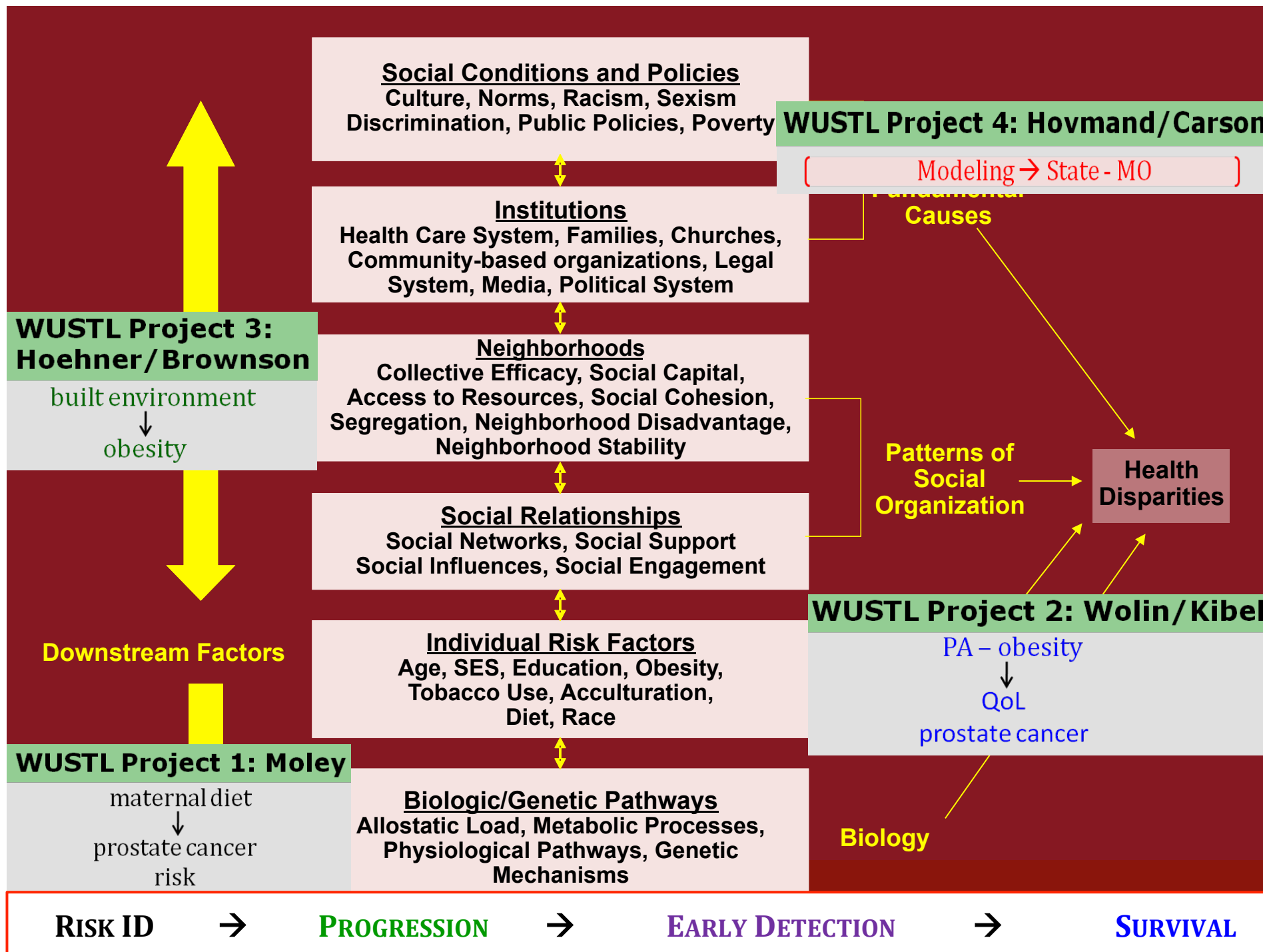


TREC@WUSTL Organization



Administrative Core





Transgenerational animal models of nutritional impact on cancer predisposition

Kelle H. Moley, MD

Vice Chair, Basic Science Research

Department of Obstetrics and Gynecology

Qiang Wang PhD

Ashley Bertschinger

www.obesity-cancer.wustl.edu

Objective

- To determine the effect of maternal high fat diet and metabolic bioenergetics on prostate gland development and susceptibility to prostate cancer in male offspring



Hypothesis

- A maternal high fat diet prior to and throughout pregnancy alters *epigenomic marks* in prostate progenitor or stem cells leading to abnormal expression of key genes in the prostate which later results in the development of cancer

Innovation and Significance

- The connection between maternal diet and prostate cancer has never been explored
- Study examines the modifying effects of additional hormonal and cell stressors known to induce neoplastic changes

Big picture

- If diet does predispose male pups to prostate cancer, can this be reversed or prevented with interventions in the mom?
- Diet or exercise prior to or during pregnancy?
- Can dietary changes in the young pup prevent these outcomes?
- What is the mechanism? Imprinting problems?

PIE

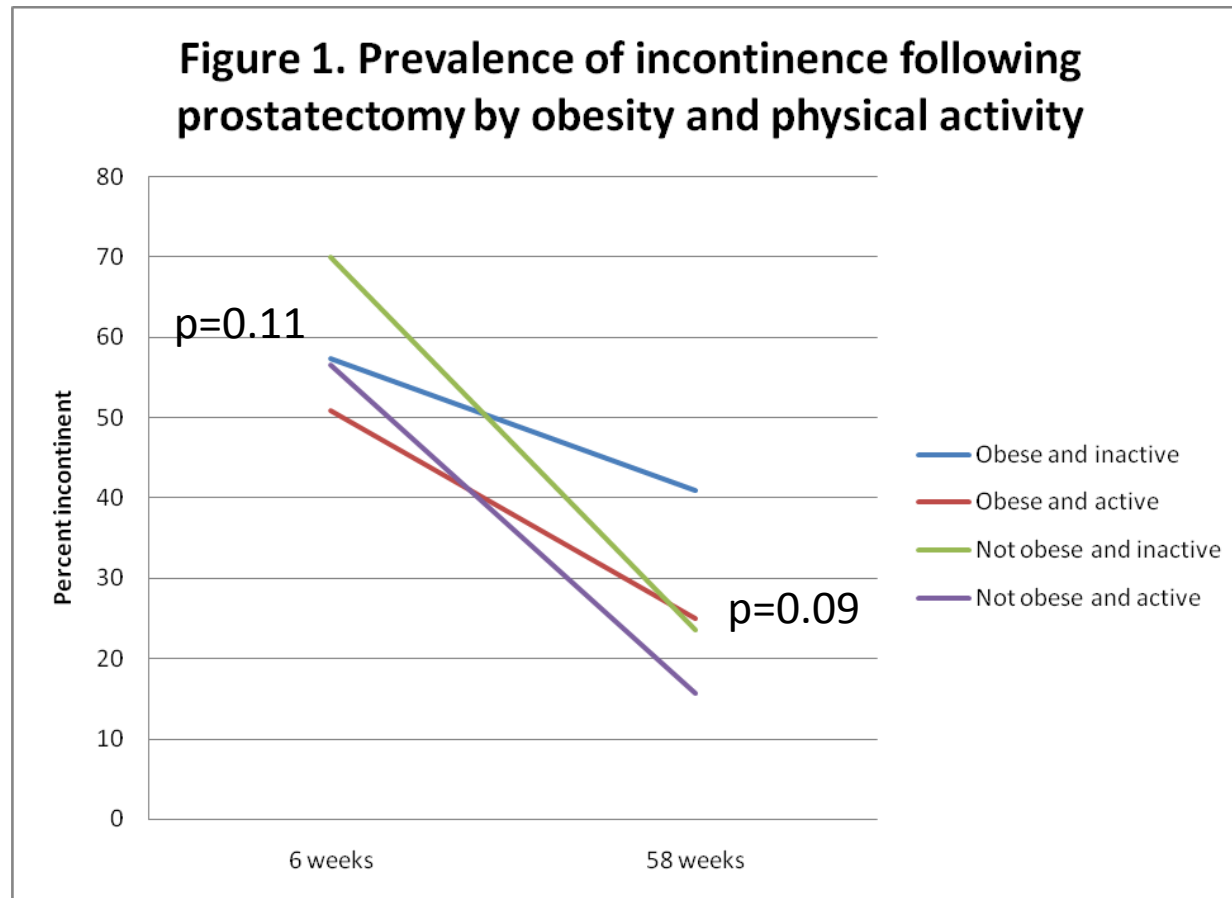
Prostatectomy, Incontinence and Erectile Function



Kathleen Wolin, ScD
Adam Kibel, MD
Robert Grubb, III, MD

www.obesity-cancer.wustl.edu

Preliminary study findings: Joint effect of obesity and PA



Wolin et al J Urology 2010

PIE Aims



- To determine the independent associations of pre-surgical physical activity (PA) and BMI on post-prostatectomy urinary and sexual function
- To explore the interaction of PA and BMI on urinary and sexual function
- To examine effect of change in PA and BMI from pre-surgery to 12 months post-op on urinary and sexual function

Innovation and Significance

- The first study to prospectively collect physical activity and obesity data using validated instruments from the pre-surgical phase to one year following radical prostatectomy
- Examines the influence of pre-surgical lifestyle on domains of physical function
- Examines the influence of change in lifestyle on domains of physical function
- Addresses large burden that urinary and sexual dysfunction pose for prostate cancer survivors

Big Picture

Future Studies from this research

- RCT of lifestyle intervention
- Prediction rule development
- Inclusion of EPIC into clinical practice via EHR
- Inclusion of activity as a key health indicator in clinical practice - “exercise is medicine”



SHOW-ME Study

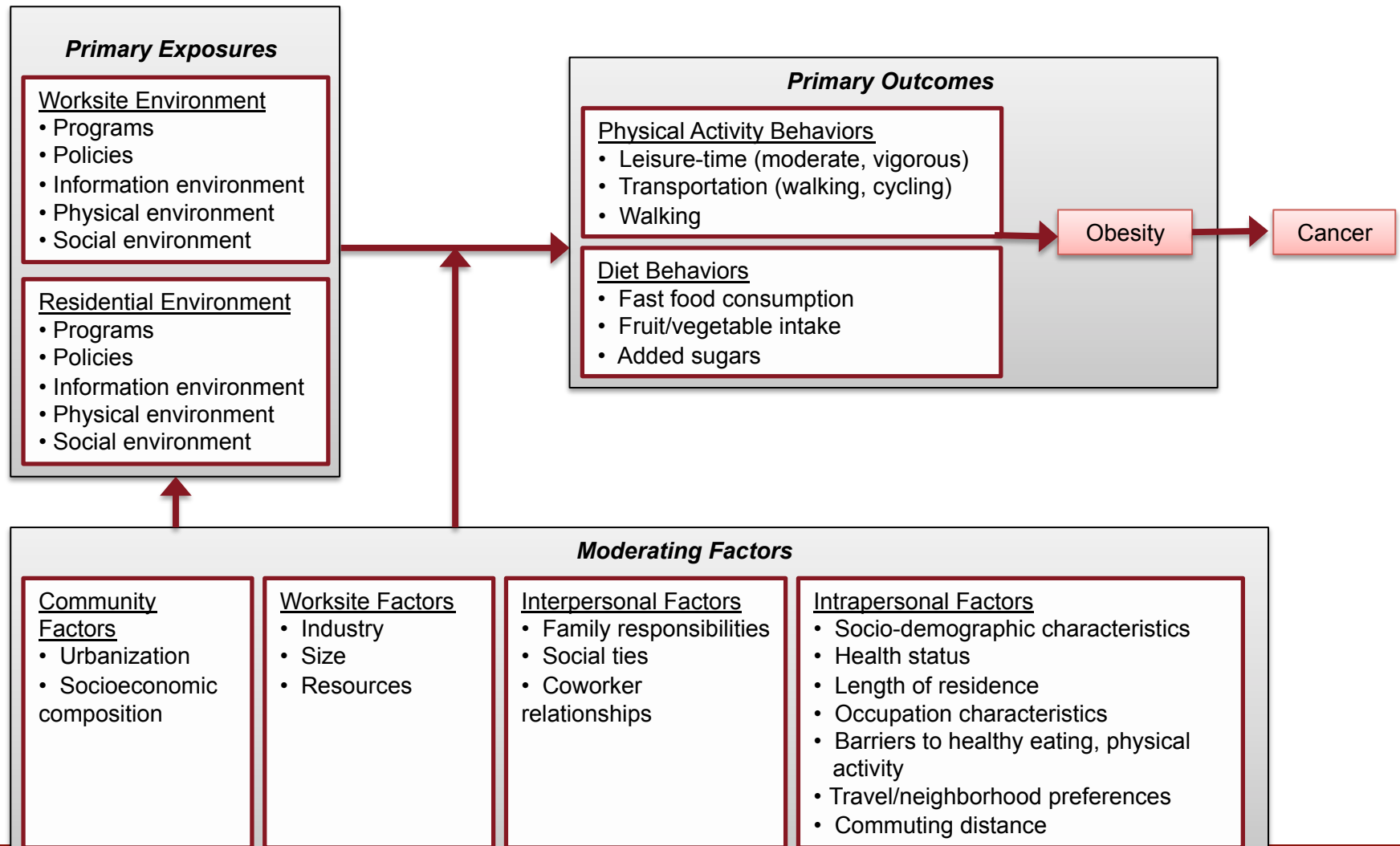
Supports at Home and Work for Maintaining Energy Balance



Christine Hoehner, PhD, MSPH
Ross Brownson, PhD

www.obesity-cancer.wustl.edu

Study Conceptual Framework



Study Aims

Overall goal: To understand how environments and policies where employed adults live and work are associated with obesity.

- To develop and test the reliability and validity of self-reported instruments for assessing worksite environments and policies relevant for physical activity and health eating.
- To examine whether specific types and number of worksite supports for physical activity and healthy eating are predictive of obesity.
- To examine whether perceived and objectively measured characteristics of the built environment in the home and worksite neighborhood are independently and jointly associated with BMI.
- To disseminate findings to local worksites, governments, and practitioners.

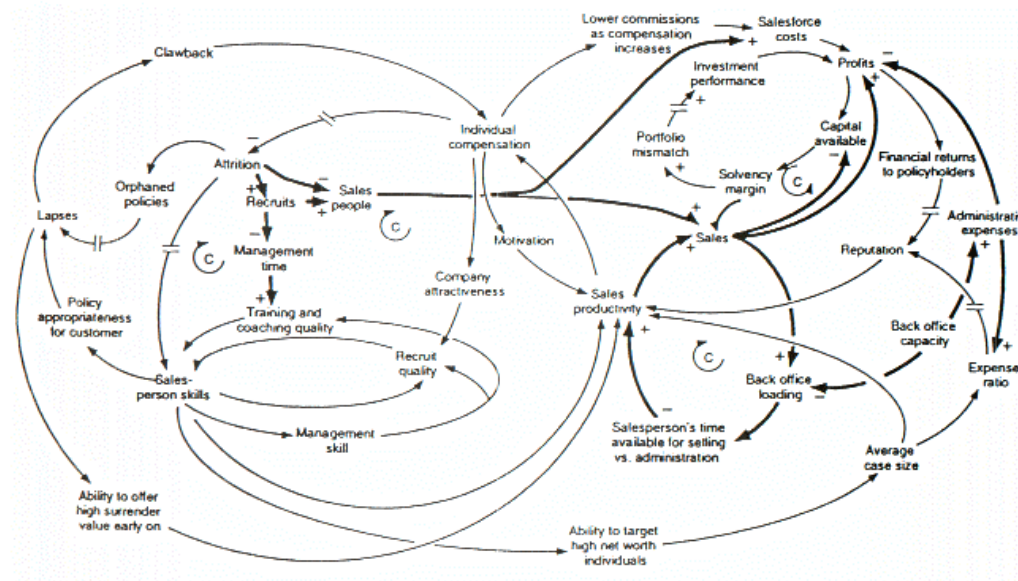
Innovation and Significance

- Examines environmental and policy influences of obesity across multiple settings
- Results will yield actionable knowledge about what policy and organizational changes would have the greatest impact
- Addresses health priorities in Missouri where large disparities in obesity and related cancers exist

Big Picture

- Worksite toolkit for environmental and policy supports to prevent and reduce obesity
 - Disseminated and Implemented across MO

Social Determinants in the Link between Obesity and Cancer



Model integrates across projects to State

Peter Hovmand, PhD

Kenneth Carson, MD

www.obesity-cancer.wustl.edu

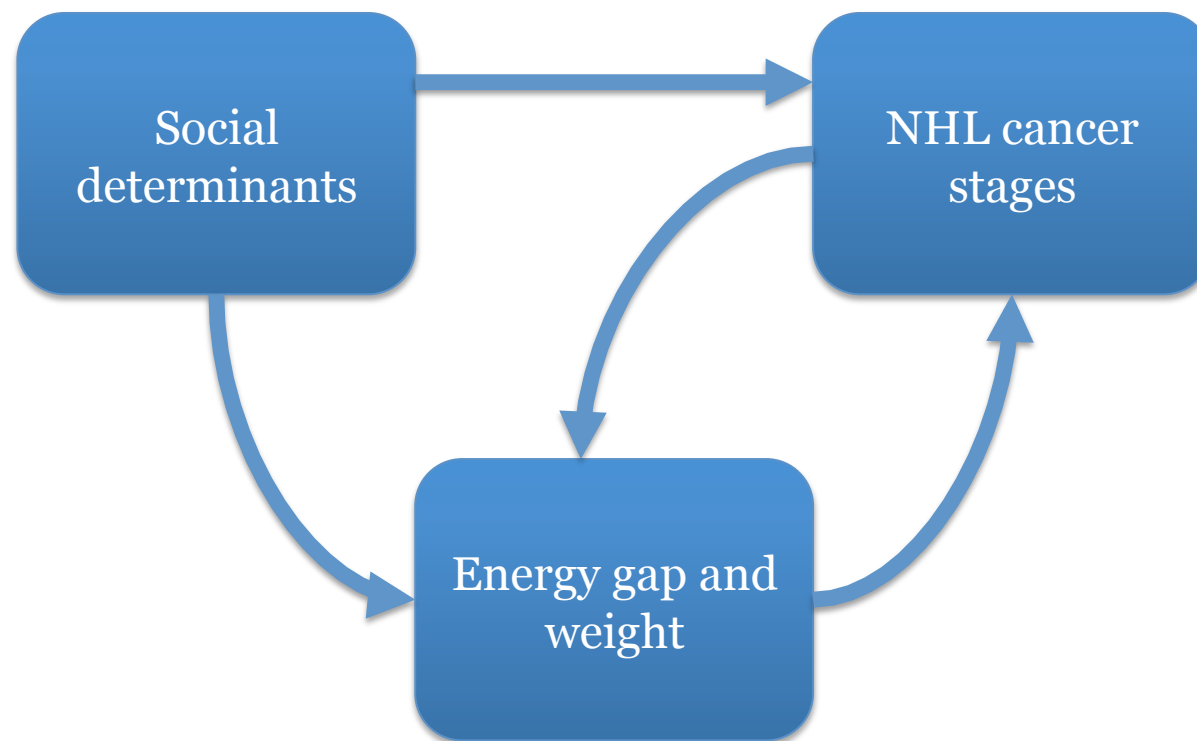
Specific Aims

- Develop a multi-cohort system dynamics computer simulation model of obesity and NHL population level outcome trends.
- Analyze the resulting model to identify how social determinants influence obesity and NHL population level outcome trends.
- Design guidelines along with their implementation strategies to identify the most effective way to reduce the impact of social determinants of NHL population level outcomes.

Innovation and Significance

- Builds on an innovative system dynamics model of childhood obesity by extending the model into adulthood across the lifespan and develop a NHL model that will be combined with the extended obesity model
- Project provides a rigorous conceptual models of how social determinants for obesity and NHL might interact over time
- Model will help identify key areas for future transdisciplinary research that have high potential for population-level impact

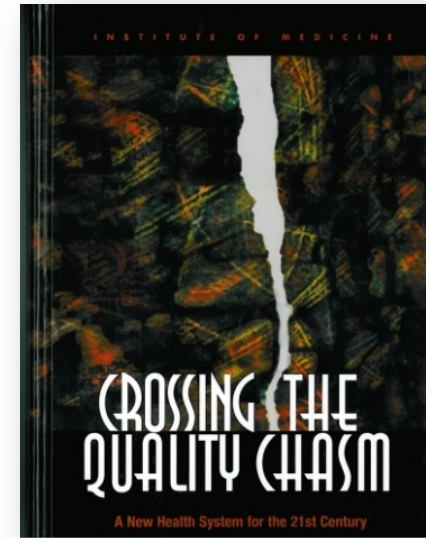
Three major sectors of obesity-cancer of simulation model



Dissemination and Implementation (D&I) Core

Core Leader

Enola K. Proctor, PhD

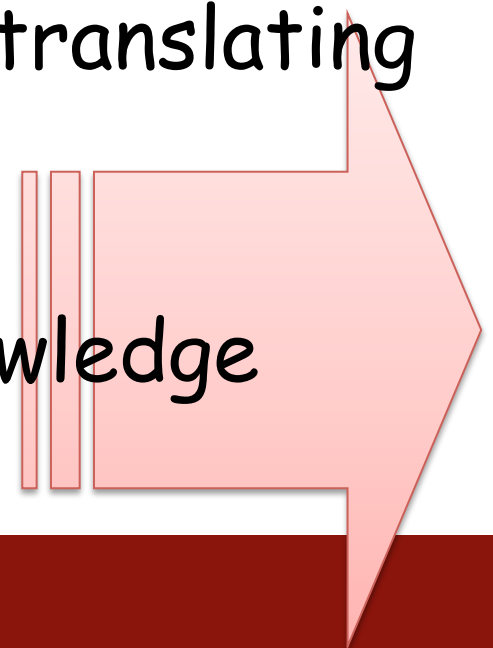


T1, T2, T3...

T1 studies: basic research science
translated to humans

T2 studies: research translated into
clinical practice; knowledge translating
to patients

T3 studies: translation of knowledge
into clinical practice



D & I goals for TREC

Increase D&I research capacity of TREC projects

Identify approaches & tools to enhance
dissemination of discoveries related to energy,
balance, & cancer

Apply effective strategies to disseminate &
implement evidence-based discoveries from
TREC

Accelerate public health impact of TREC research

Distinctions: D&I

Implementation is the use of strategies to adopt and integrate evidence-based health interventions and change practice patterns within specific settings.

Distinctions: D&I

Dissemination is the targeted distribution of information and intervention materials to a specific public health or clinical practice audience.

The intent is to spread knowledge and the associated evidence-based interventions.

TREC's tool kit for D&I research

- Implementation strategies
- Dissemination strategies
- Key audiences
- Dissemination outcomes
- Designs for Implementation Research



D&I Core June TREC Meeting

Meet and Collaborate with D&I
Leaders

www.obesity-cancer.wustl.edu

Education, Training, and Outreach Core

Core Leaders

Sarah Gehlert, PhD

Aimee James, PhD, MPH

Specific Aims

- Produce scholars capable of applying transdisciplinary research approaches to energetics & cancer to understand the topic in its complexity, from discovery to implementation
- Expose existing predoctoral, postdoctoral, other investigators to transdisciplinary learning opportunities in the area of energetics & cancer

Selected Mentors

Name	Primary Discipline
Margaret Barton-Burke, PhD	Nursing
Peter Benson, PhD	Sociocultural Anthropology
Ross Brownson, PhD	Epidemiology; Built Environment; Policy
Laura Bierut, MD	Psychiatry; Nicotine genetics; Addiction Research
Nicholas Davidson, MD, DSc	Gastroenterology; Developmental Biology
Matthew Ellis, MB, Bchir, PhD	Breast Cancer Medical Oncology
Jeffery Gill, PhD, MBA	Political Science; Statistics
Paul Goodfellow, PhD	Molecular Genetics & Genomics
Debra Haire-Joshu, PhD	Behavioral Science; Obesity Prevention; Policy
Samuel Klein, MD	Nutritional Science; Energy Metabolism; Obesity, Weight Mgmt.
Enola Proctor, PhD	Social Work; Translational Science; D&I Science
Susan Racette, PhD	Energy Metabolism and Nutrition
Mario Schootman, PhD	Epidemiology

Training Activities

- Professional development seminars for predoctoral and postdoctoral scholars
- Specialized individual programs of study that expose scholars to the spectrum of perspectives on energetics and cancer
- Research Methods Workshop Series
- Transdisciplinary Journal Club
- Works in Progress



SEE POSTER
FOR MORE
INFORMATION

Postdoctoral Fellows

1. Masa Oka, DDES (Urban Design)
2. Jihyun Song, PhD (Statistics)
3. Su-Hsin Chang, PhD (Economics)



Statistical Methods and Bioinformatics Core

Core Leaders

Jeffery Gill, PhD, MBA

Rakesh Nagarajan, MD, PhD

Mission/Activities

- Advance data analysis function of research projects
- Advise on data harmonization within research projects and across projects through application of innovative data planning and statistical methods
- Provide an infrastructure of clinical and translational research information systems



Research Methods Workshop Series

hosted by

TREC@WUSTL

Session One: “An Introduction to Non-Parametric Data Analysis”

Friday, November 18 from 3 to 4:30 p.m. – Center for Advanced Medicine Farrell Conference Room 1

Presenter: Jeff Gill, PhD

Department of Political Science, College of Arts & Sciences, Washington University in St. Louis
Division of Biostatistics and Division of Public Health Sciences, Washington University School of Medicine

ABSTRACT: Sometimes researchers do not have a specific model or parametric assumption in mind when modeling health science data. Nonparametric approaches are useful in these circumstances for visualization as well as for suggesting underlying assumptions for subsequent parametric models. This talk reviews the basics of nonparametric data analysis from bivariate smoothing, kernels, and splines, to full regression-style generalized additive models.

Session Two: “A Tutorial on Factor Analysis”

Friday, December 2 from 3 to 4:30 p.m. – Center for Advanced Medicine Farrell Conference Room 1

Presenter: Jihyun Song, PhD

Postdoctoral Fellow, TREC@WUSTL

ABSTRACT: Factor analysis groups variables with similar characteristics together. With factor analysis, we can produce a small number of factors from a large number of variables which is capable of explaining the observed variance in the large number of variables. This talk covers the basic statistical foundations underlying factor analysis and what kinds of questions can be answered using factor analysis. Dr. Song will also perform a factor analysis procedure and interpret the results using a simple example.

RSVP requested but not required: djaegers@wustl.edu – The entire WUSTL community is welcome

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Developmental Research Core

Core Leaders

Debra L. Haire-Joshu, PhD

Samuel A. Klein, MD

Within-Center Pilot Applications

Application Titles	Departments
Transdisciplinary research on obesity and smoking in reducing cancer risks	Surgery; Psychiatry
Development of novel measures of personal spatio-temporal exposures to obesogenic environments	Surgery; OT
Effects of positive energy balance and moderate weight gain on in vivo colonocyte proliferation rate	Internal Medicine; Gastroenterology
The effects of obesity on breast cancer development and NK cell-mediated antitumor immune responses	ObGYN; Immunobiology
Analyses of metabolic regulation of hepatocellular proliferation in HCC and liver regeneration	Pediatrics; Radiology
TBC1D3, a primate-specific oncogene links metabolism and cancer--developing a stem-cell model	Cell Bio & Physiology; Genetics
Inflammation as a mediator of the energetics and post-prostatectomy incontinence relation	Surgery; Pathology

**TREC - 2011
Pilot Studies Reviewer Form**

Applicant name and title:

Department:

Title of project:

New NIH 9-point
rating scale.

Exceptional	1
Poor	9

Utilizing the new NIH 9-point rating scale, please assign a score based on your overall impression of this pilot application. This rating is exactly what you do for a study section group. Note comments in each section.

OVERALL SCORE FOR PROPOSAL:

Score: _____

(Please explain)

1. Significance of proposed project **Score:** _____

2. Innovation of proposed project **Score:** _____

3. Approach and relevance of research **Score:** _____

4. FOR NEW INVESTIGATORS - Promise for future productivity and independence **Score:** _____

OR

OR

FOR ESTABLISHED INVESTIGATORS - Evaluation of the proposal as a new or innovative idea that represents a clear and distinct departure from investigator's ongoing research interest **Score:** _____

5. Please point out any scientific and budget overlap with ongoing projects, or alert us if there is need for clarification in this area.

6. If you wish, please use the next page to give as much feedback as you would like which may be useful to the applicant. Comments will be filtered through the review subcommittee and de-identified before being sent to the applicant.

Rater: _____

Date: _____

Return to: Victoria Anwuri via Fax: (314) 747-4651 or E-mail: vanwuri@wustl.edu or Mail: WUSM, Campus Box 8100, 600 South Euclid, St. Louis, MO 63110 **by January 9, 2012.**

Coordinated Review

**See you in
St. Louis, Missouri!**

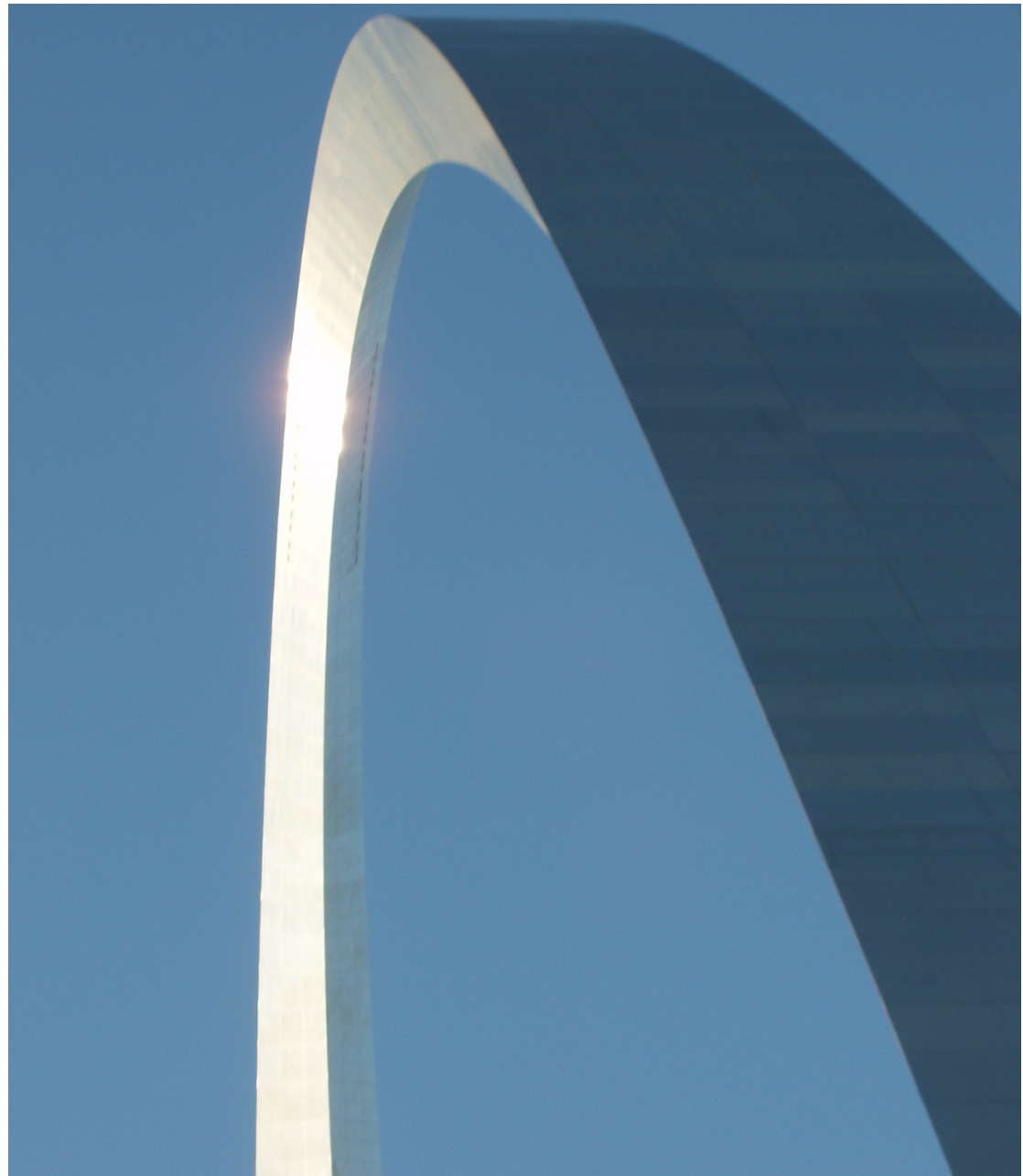
**on
June 20-21, 2012**

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***The Show-me State***

***The Gateway to the  
West***

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