IGEP Title: **Translational Obesity Research**
Co-P.I.'s*:   **Kevin P. Davy, Professor, Human Nutrition, Foods and Exercise**
                  Paul Estabrooks, Professor, Human Nutrition, Foods and Exercise

Faculty in Translational Obesity Research IGEP

Faculty Name	College	Dept	Area of Expertise
Fabio Almeida	CALS	HNFE	Social networks
Isabel Bradburn	CLAHS	HD	Intergenerational obesity
Yvonnes Chen	CLAHS	COMM	Health and media literacy
George Davis	CALS	AAEC	Health economics
Brenda Davy	CALS	HNFE	Obesity prevention and treatment
Kevin Davy*	CALS	HNFE	Cardiometabolic dysfunction in obesity
Paul Estabrooks*	CALS	HNFE	Research to Practice Translation
Jennie Hill	CALS	HNFE	Built environment; social determinants
Mathew Hulver	CALS	HNFE	Dysregulated skeletal muscle metabolism
Deborah Good	CALS	HNFE	Hypothalamic regulation of energy balance; genetics
Madlyn Frisard	CALS	HNFE	Mitochondrial dysfunction
Tina Savla	CLAHS	HD	Biostatistics
Eva Schmelz	CALS	HNFE	Obesity and cancer
Richard Winett	COS	PYSCH	Health behavior change
Wen You	CALS	AAEC	Health economics; econometrics
Jamie Zoellner	CALS	HNFE	Community based participatory research; health disparities; health literacy

*Co-PI emails: kdavy@vt.edu; estbrkp@vt.edu

Introduction: Training Program Rationale. Obesity is one of the most complex public health problems facing the nation and world today. More than a third of Americans and over one billion people worldwide are obese. Significant progress has been made in basic science discoveries related to the regulation of energy balance and in identifying efficacious lifestyle and pharmacologic approaches to manage obesity under tightly controlled conditions in primarily academic healthcare settings. However, there is little information available regarding the clinical relevance of many basic science discoveries or in the translation of promising clinical interventions to evidenced-based practice. Furthermore, little progress has been made in implementing and disseminating effective obesity prevention and treatment programs on a broad scale to have a positive public health impact. Thus, innovative interdisciplinary graduate training programs are needed to equip the next generation of scientists with the skills and knowledge needed to tackle the complex societal problem of obesity.

This Translational Obesity Research graduate training program will draw faculty and students from diverse disciplines together to form integrative research teams with a central focus on translational obesity research, spanning from "cells to society" (i.e., from basic science to practice, policy and practice implementation; or type 1 to 4 research translation[Figure 1]). To

address the complex and multi-factorial nature of obesity and the ongoing challenge of obesity management in multiple settings, we propose to bring together faculty and graduate students from the departments of Human Nutrition, Foods and Exercise, Agricultural and Applied Economics, Communication, Human Development, and Psychology to cross traditional boundaries and conduct innovative translational obesity research.
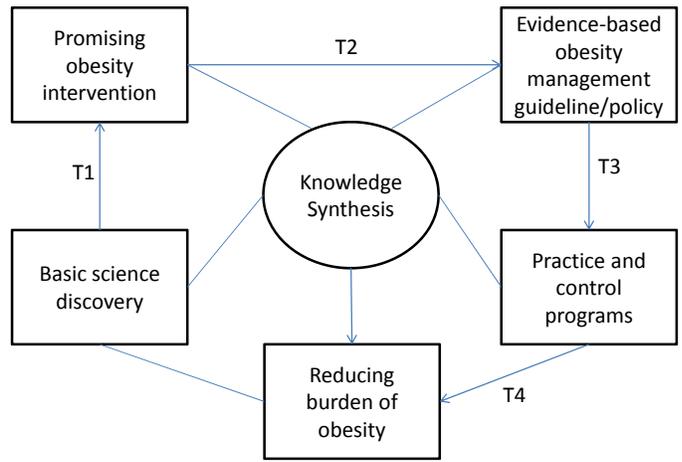
Overarching Education and Research Goals. We will create a culture of inquiry using an interdisciplinary training program to address the complex problem of obesity by including doctoral students and faculty from **3** colleges and **5** departments. Our overarching goal is to train the next generation of obesity researchers to conduct innovative research that integrates and translates knowledge of the etiology, pathophysiology and management of obesity with behavioral, environmental, economic, and social contextual information to improve the health and well-being of the Commonwealth and

Figure 1. Model of translational approach to obesity prevention and management (adapted from Agurs-Collins et al. *Obesity*, 16: s85-s94, 2008)

the nation. IGEP program participants will engage in interdisciplinary and translational obesity research projects. Coursework and research experiences will facilitate students crossing the boundaries of biomedical science, social science, economics, implementation science, and health policy. This program will enable all Translational Obesity Research participants to:

- understand the complex problem of obesity and its management;
- develop meta-cognitive reasoning, critical thinking, and communication skills necessary for engaging in and practicing interdisciplinary and translational obesity research;
- be engaged as member of an integrated research team focused on interdisciplinary and translational obesity research.

Long Term Goals. We wish to develop and sustain a nationally and internationally recognized integrated research and graduate education training program that addresses one of today's most pressing public health problems: obesity prevention and treatment. Our long-term goal is to obtain funding for a NIH T32 Institutional Predoctoral Training Grant.

Intellectual Research Focus: Three research foci were identified to capitalize on the collective strengths of our (faculty) and their ability to address complex problems in the obesity area.
- **Causes and consequences of obesity and related disorders:** Understanding the mechanisms which regulate energy balance and lead to cardiovascular, metabolic and endocrine dysfunction (K Davy, B Davy, Good, Hulver, Frisard, Schmelz)
- **Breaking the link between obesity and its associated health risks:** Determine the most efficacious lifestyle and pharmacological approaches for preventing and treating obesity and its associated health conditions (K Davy, B Davy, Estabrooks, Hulver, Frisard, Winett)

- **Obesity prevention and management dissemination and implementation:** Determine how efficacious weight management and obesity prevention programs, policies, and practices can be adapted, implemented, and sustained in communities and settings where people live, learn, work, and play (e.g., worksites, schools, faith-based organizations, healthcare clinics). This will include a focus on reaching a broad cross-section of the population in a cost effective and sustainable manner to achieve a public health impact—especially within populations that could benefit most from obesity prevention and treatment strategies (Almeida, Bradburn, Chen, Davis, Estabrooks, Hill, Savla, Winett, You, Zoellner)

Students will develop mastery of at least one of the three thematic areas through the core coursework, participation in weekly seminars, laboratory meetings, attendance at national or international conferences, informal discussion with IGEP and visiting faculty, independent reading, and dissertation research. The core courses identified for our IGEP are as follows:
- Introduction to Translational Science (HNFE 5984);
- Advanced Topics in HNFE: Controversies in Obesity Research (HNFE 6064);
- Interdisciplinary Research (GRAD 5134).

All of the above courses have undergone review and received approval; HNFE 6064 has been taught once (Instructor: K Davy) in the prior year. We will be seeking approval to cross list HNFE 5984 and HNFE 6064 with all the other 4 departments (i.e., AAEC, HD, PYSCH, and COMM) in advance of their first offering. A coursework timeline and course descriptions are in Appendix 1.

Existing Strengths and Anticipated Challenges. The core and affiliated faculty in this IGEP program have a strong history of interdisciplinary and translational research. The current funding (see examples below), in excess of 10 million dollars from the NIH and industry, provides an initial source of funding for graduate training in Translational Obesity Research. Since 2005, our faculty have published nearly 170 relevant peer reviewed manuscripts; approximately 20% of these were co-authored by 2 or more of faculty from our research base and as a demonstration of our developing collaborations, 21 manuscripts with multiple authors from our faculty have been published in the last 2 years. In addition, we have recently submitted a proposal for the creation of a Center for Translational Obesity Research and intend for the proposed IGEP to be an integral component. Indeed, graduate training in translation obesity research is a primary objective of our center. Finally, most of our current student's graduate committees are comprised of 2-3 IGEP faculty members. Taken together, our Translational Obesity Research training program was developed within a larger framework that has already demonstrated early success in overcoming many of the anticipate challenges of interdisciplinary research. The proposed IGEP is needed to accelerate growth and enhance the competitiveness of this group for obtaining an extramurally funded training program focused on Translational Obesity Research.

Examples of Current Collaborative Grants
Title: Tailored Worksite Weight Control Programs Agency: NIH/NCI
P.I.: Estabrooks, Co-I's: Almeida, B. Davy, Hill, You, Zoellner
Budget Period: 7/1/07-6/30/12   Award Amount: $3,978,279

Title: Inflammatory Regulation of Lipid Accumulation in Skeletal Muscle with Obesity

P.I.: Hulver, Co-I's: Frisard and K. Davy   Agency: NIH/NIDDK
Budget Period: 04/01/08 - 01/31/13   Award Amount: $1,700,000

Title: Maintaining Resistance Training in Older Prediabetic Adults: Theoretical Approach
Co-P.I.'s: B. Davy & Winett, Co-I: Savla Agency: NIH
Budget Period: 7/1/09-6/30/14   Award Amount: $3,844,400

Title: Intergenerational Obesity: Developing an Ecological Approach
Co- P.I.'s Bradburn & Roberto Co-I's: B. Davy, Estabrooks (03/01/11 – 02/28/13)
Agency: National Institutes of Health Award Amount: 3/1/11-2/28/13
Award Amount: $40,000

Title: Sipsmarter: A Nutrition Literacy Approach to Reducing Sugar-Sweetened Beverages
P.I.: Zoellner, Co-I's: Estabrooks, B. Davy, Hill, You, Chen Budget Period: 7/1/11-6/31/16
Agency: NIH   A   Award Amount: $3,749,389

Title: The Reach and Effectiveness of Technology-Enhanced Diabetes Prevention
P.I.: Almeida, Co-I's: Estabrooks, B. Davy, You Agency: NIH
Budget Period: Pending (priority score=10) Award Amount: $3,903,456

Recruitment. We will begin recruiting in Spring 2012 using multiple approaches that have been successful for us in the past. We will begin by recruiting from existing graduate and undergraduate programs at Virginia Tech. Regular program announcements will be posted on relevant Virginia Tech Institute's and the Translational Obesity Research Center websites. Recruitment at the national and international level will be via postings to professional society websites (e.g., Obesity Society, American Society of Nutrition, American Psychological Association, Society of Behavioral Medicine, etc.), emails, flyers, and word of mouth (e.g., at professional meeting receptions, etc.). Importantly, many of our faculty attract graduate students by virtue of their strong professional networking and excellent reputation in their field. In addition, minorities and underrepresented groups will be targeted for recruitment through pertinent websites. Finally, we will use word-of-mouth and site visits to other institutions to recruit new students. All faculty will be provided with a single PowerPoint slide with details of our program to showcase our program during invited seminars, for example.

Retention. As with our research process, we will use a participatory approach between faculty and students to identify research questions, determine study designs, and set goals for student progress. Using different group dynamics strategies similar to those used in many of our behavioral interventions we will ensure that students feel they fulfill a specific role with the group, have autonomy in determining the direction of their research and the overall goals of the program. We will also ensure that there are opportunities for ongoing communication, interaction, and cooperation in developing projects, participating in manuscript writing, grant proposal submissions, and identifying additional shared coursework. We will also organize less formal interactions that we have used in our labs with success such as outdoor activities, coffee and a conversation events, and barbeques at faculty homes. The overarching goal of our retention strategy is to create a strong sense of community among faculty and students.

We have also found in our respective laboratories that in addition to having a faculty mentor and committee that will meet regularly with the students, that students benefit from having a peer mentor who has been involved in the program for a year or more. In the first year of the IGEP we will match students with existing students in our programs to ensure that students feel welcomed and have someone to go to when they have questions or encounter challenges. In our ongoing seminar series, regular group meetings, and journal club activities we will give opportunities for student input, interaction, and engagement. We also intend to use interactive technologies that will include, but are not limited to, (1) a group listserv to report successes, interesting and related topics from the lay media, and upcoming events, (2) a group website that will highlight all faculty and student members, ongoing projects, goals, and successes of the group, and (3) a scholar or similar site that can be used for resource sharing, a calendar of events, opportunities for blogs, and webinars. We will create a Translational Obesity Research training program monthly newsletter to highlight successes, projects, student and faculty profiles, and provide information on upcoming events. We believe these strategies will result in exceptionally trained students who will have strong ties and commitment towards the IGEP.

Commitment to Growth and Sustainability. We intend to reach a steady state of at least 10 graduate students enrolled annually in the Translational Obesity Research training program by the end of the first 3 years. In addition to the 4 graduate research assistant positions provided by the IGEP program, we expect to have at least 6 additional students funded by external grants. All IGEP students will be expected to submit an NIH Individual NRSA Predoctoral Training Grant by the end of their first year in the program. This will enhance our ability to use the 4 IGEP graduate research assistants in the most effective manner possible. Our goal is to seek funding for a NIH T32 Institutional Predoctoral Training Grant by 2015. These highly competitive awards typically provide tuition and stipend for up to 6 trainees per year over a 5 year period. In addition, submission of an NIH National Research Service Award (or similar award) will be expected for all IGEP students. Listed below are examples of other planned proposals for pursuing additional funding for the IGEP program.

Table. Examples of planned proposals for pursuing additional funding

Agency	RFP/RFA Title	PIs	Due Date
NIH	R.L. Kirschstein NRSA for Individual Predoctoral Fellow	All	open
NIH	R. L. Kirschstein NRSA Institutional Research Training Grants	K Davy Estabrooks	open
USDA	Food and Agricultural Sciences National Needs Graduate and Postgraduate Fellowship (NNF) Grants Program	Estabrooks; Chen; Hill; You; Zoellner	May 2012 or later
NIH	Translational Research for Prevention and Control of Diabetes and Obesity (R18)	Hulver Others	March 2012 or later
NIH	Planning Grants for Translational Research for Prevention and Control of Diabetes and Obesity	Estabrooks; Chen; B Davy You; Winett	March 2012 or later
NIH	Nutrition Obesity Research Center (P30)	K Davy Estabrooks	June 2014 or later

Appendix 1. Translational Obesity Research Coursework Timeline and Course Descriptions

Year 1 (2012-13)	Year 2 (2013-14)	Year 3 (2014-15)
FALL: HNFE 5984 Introduction to Translational Science (3 cr.)	**FALL:** GRAD 5134 Interdisciplinary Research (3 cr.)	GRAD 7994 Dissertation
SPRING: HNFE 6064 Advanced Topics in HNFE: Current Controversies in Obesity Research (3 cr.)	**SPRING:** Departmental Core Coursework	GRAD 7994 Dissertation
Both Semesters: Departmental Core Coursework Complete IRB or IACUC training Submit NIH NRSA Award	**Both Semesters** Departmental Core Coursework	

HNFE 5984 Introduction to Translational Science (3 cr). Instructors: IGEP Faculty. The study of complex public health problems encompasses a broad spectrum of research from basic to public health science. While researchers can spend a career conducting only basic, clinical, behavioral, or public health research there has been a strong shift towards focusing on translational science across these domains. Translational science has been defined in many ways (e.g., bench to bedside; clinic to community), but the underlying principle is that there is a need for continuity, bi-directional communication, and interdisciplinary research to ultimately improve health. This class will revolve around in-depth discussions of research across the translational spectrum and highlight core knowledge needed for understanding the role of research in addressing complex public health problems.

HNFE 6064 Advanced Topics in HNFE: Current Controversies in Obesity Research. Instructors: IGEP Faculty. *This course was first offered in the Spring of 2010.* The major objective of this course will be for students to identify and develop and fundamental understanding for some of the major ongoing controversies in the obesity area related to dietary intake and physical activity including the roles of macronutrient content of the diet in contributing to obesity development and its management; the amount of physical activity required for prevention of weight gain, weight loss and weight maintenance, and fitness vs. fatness and chronic disease risk in obesity; describe the use of a variety of techniques to assess dietary intake, energy expenditure, energy balance and body composition, limitations of particular techniques, and factors to consider in determining appropriate choice of tools for a particular study design; and critically review and synthesize research articles in area of controversy.

GRAD 5134 Interdisciplinary Research (3 cr). Instructors: IGEP Faculty. This course will be taught by teams of faculty to provide in-depth coverage of significant questions and topics in the area of translational obesity research including regulation of body weight, dysregulation of metabolism, cardiometabolic consequences of obesity, and dissemination and implementation of efficacious obesity interventions in different settings. These topics require interdisciplinary expertise, methodologies, and analyses. Students will work as part of an interdisciplinary team to identify, develop, and defend (in both written and oral form) a testable hypothesis to address an important unresolved problem in the obesity area.

VirginiaTech

College of Agriculture
and Life Sciences

Department of Human Nutrition, Foods, & Exercise
Virginia Tech
E-mail: estabrkp@vt.edu
E-mail: kdavy@vt.edu

November 3, 2011

Dr. Karen DePauw
Vice President and Dean of the Graduate School

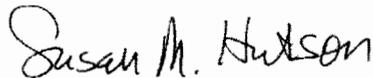Re: Translational Obesity Research Interdisciplinary Graduate Education Program Proposal

Dear Karen:

As Department Head of Human Nutrition, Foods and Exercise (HNFE), I support the proposed Interdisciplinary Graduate Education Program (IGEP) proposal submitted by Drs. Kevin Davy and Paul Estabrooks (HNFE). This Translational Obesity Research IGEP program will bring together faculty and graduate students from 3 colleges and 5 departments in an interdisciplinary effort to address the complex problem of understanding the causes and treatment of obesity.

The focus of this IGEP is particularly noteworthy given that obesity was identified as a strategic priority in the 2006-2012 strategic plan and will continue to be significant to the future of health sciences at Virginia Tech. As such, the proposed Translational Obesity Research IGEP is important to the Department of Human Nutrition, Foods and Exercise and the College of Agriculture and Life Sciences.

Our confidence in the future of this IGEP program is based on the observation that many of the faculty in this group are already engaged in interdisciplinary efforts to train graduate students to study the complex society problem of obesity.

Sincerely,

Susan M. Hutson

_____

Susan Hutson, Department Head, HNFE

Said Mostaghimi

_____

Said Mostaghimi, Associate Dean, CALS

VirginiaTech

College of Agriculture
and Life Sciences

Department of Agricultural and Applied Economics
208 Hutcheson Hall (0401)
Blacksburg, Virginia 24061
540/231-6301 Fax: 540/231-7417
www.aaec.vt.edu

November 3, 2011

Dr. Karen DePauw
Vice President and Dean of the Graduate School

Re: Translational Obesity Research Interdisciplinary Graduate Education Program Proposal

Dear Karen:

We support the proposed Interdisciplinary Graduate Education Program IGEP proposal submitted by Drs. Kevin Davy and Paul Estabrooks (HNFE). This Translational Obesity Research IGEP program will bring together faculty and graduate students from 3 colleges and 5 departments in a truly interdisciplinary effort to address the complex problem of understanding the causes and treatment of obesity.

The focus of this IGEP is particularly noteworthy given that obesity was identified as a strategic priority in the 2006-2012 strategic plan and will continue to be significant to the future of health sciences at Virginia Tech. As such, the proposed Translational Obesity Research IGEP is important to our colleges and departments. Drs. Wen You and George Davis have been key partners in this interdisciplinary team for a number of years now and it is my hope that the IGEP will continue to help this initiative grow!

Our confidence in the future of this IGEP program is based on the observation that many of the faculty in this group are already engaged in interdisciplinary efforts to train graduate students to study the complex society problem of obesity.

Sincerely,

Kevin J. Boyle
Professor and Head

VirginiaTech

College of Science

Office of the Dean
College of Science Administration (0405)
Blacksburg, Virginia 24061
540/231-5422 Fax: 540/231-3380
www.cos.vt.edu

November 3, 2011

Dr. Karen DePauw
Vice President and Dean of the Graduate School

Re: Translational Obesity Research Interdisciplinary Graduate Education Program Proposal

Dear Karen:

We support the proposed Interdisciplinary Graduate Education Program IGEP proposal submitted by Drs. Kevin Davy and Paul Estabrooks (HNFE).   This Translational Obesity Research IGEP program will bring together faculty and graduate students from 3 colleges and 5 departments in a truly interdisciplinary effort to address the complex problem of understanding the causes and treatment of obesity.

The focus of this IGEP is particularly noteworthy given that obesity was identified as a strategic priority in the 2006-2012 strategic plan and will continue to be significant to the future of health sciences at Virginia Tech.   As such, the proposed Translational Obesity Research IGEP is important to our colleges and departments. Our confidence in the future of this IGEP program is based on the observation that many of the faculty in this group are already engaged in interdisciplinary efforts to train graduate students to study the complex society problem of obesity.

Sincerely,

Sincerely yours,

Nancy Ross,
Associate Dean College of Science

Robert Stephens
Chair, Department of Psychology

November 11, 2011

Dr. Karen P. DePauw
Vice President and Dean for Graduate Education
Virginia Tech
Graduate Life Center 235

Dear Dr. DePauw,

I support the proposed Interdisciplinary Graduate Education Program in Translational
Obesity Research. This propose graduate training program will draw faculty and students
from diverse disciplines together to form integrative research teams to examine one of the
most important public health issues in the contemporary world. To address the complex
and multi-factorial nature of obesity and the ongoing challenge of obesity management in
multiple settings, this program will bring together faculty and graduate students from five
departments in three colleges to conduct innovative translational obesity research.

Through their participation on the steering committee, professors Tina Savla and Isabelle
Bradburn from the Department of Human Development and professor Yvonnes Chen
from the Department of Communication will provide guidance on incorporating the
perspectives of the social and human sciences into the program. The further development
of this IGEP should draw upon additional faculty and departments to offer graduate
courses, advise students, and develop thesis topics. The involvement of CLAHS faculty,
along with faculty from the Colleges of Agriculture and Life Sciences and Science
creates opportunities for graduate students and faculty to pursue innovative and
interdisciplinary fields of research and education.

I look forward to supporting the growth of this innovative program that integrates a
breadth of interdisciplinary perspectives.

Sincerely,

Sue Ott Rowlands
Dean, CLAHS

Karen Roberto
Center for Gerontology

Anisa Zvonkovic
Department Head, Human Development

Robert E. Denton, Jr.
W. Thomas Rice Chair
Rice Center for Leader Development
Pamplin College of Business
and
Professor and Head
Department of Communication
College of Liberal Arts and Human Sciences
115 Shanks Hall (0311),
Blacksburg, Virginia 24061
Off: 540/231-9825 Fax: 540/231-9817
Cell: 540/230-7147
email: rdenton@vt.edu

⊞ VirginiaTech

November 3, 2011

Dr. Karen DePauw
Vice President and Dean of the Graduate School
Graduate School
Graduate Life Center
Campus   0325

Re: Translational Obesity Research Interdisciplinary Graduate Education Program Proposal

Dear Karen:

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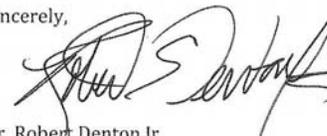
Dr. Robert Denton Jr.
W. Thomas Rice Chair and Department Head

Invent the Future