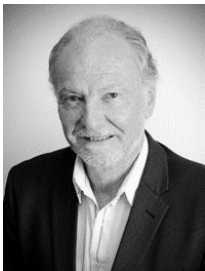


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News from the NORC Director



Eric Ravussin, PhD

Boyd Professor

Associate Executive Director of
Clinical Science

Pennington Biomedical

Despite all the stress associated with the COVID-19 pandemic and the present peak incidence of the Omicron variant, 2021 has been a very busy and productive year for our Pennington/Louisiana NORC. Some of the major accomplishments are summarized below:

1. **Competitive Renewal Application.** After a successful outcome from an October 2020 NIH Study Section, our 4th cycle renewal application was renewed on May 1, 2021, for another 5 years. The highlights of the competitive renewal are as follows:
 - Since its inception in 2005, our NORC has increased its research base direct cost from \$11.4M to almost \$30M at Pennington and up to >\$43M with our new members in New Orleans

(LSU-HSC and Tulane). We now have 63 full members contributing to this research funding, 70 collaborating members and 13 mentored members.

- Our NORC members will continue to have access to three state-of-the-art biomedical cores to conduct their research with the highest rigor standards.
 - **Human Phenotyping Core**
 - **Molecular Mechanism Core**
 - **Animal Model and Phenotyping Core**
- We are in the process of establishing Translational Research Teams to address big research questions from the basic science level to clinical investigation and finally to the population, all around the theme of **“Nutrition, Obesity and Metabolic Health through the Lifespan”**.

2. Thanks to the infrastructure established by our Pennington/Louisiana NORC and in collaboration with the Louisiana Clinical & Translational Science Center (LA CaTS), Pennington Biomedical has recently (December 10, 2021) been awarded one of the six **Clinical Centers of the NIH Common Fund’s Nutrition for Precision Health, powered by the All of Us Research Program Consortium**.

3. **2021 NORC P&F applications.** Applications were due on July 2, 2021, and three awards were issued this year:

- **Emily Flanagan** – “An Examination of Brown Adipose Tissue and Energy Expenditure in Infants”
- **Susan Burke** – “Defining the role of CD36 in the regulation of pancreatic β -cell function”

- **Rebecca Solch** – “Characterization of a gut microbiota-centered model of mild cognitive impairment”
- 4. Our NORC was also successful in securing **two supplemental grants** in 2021
 - The first is to provide 1-year salary support for Dr. Ursula White (20%), an early career scholar from Pennington Biomedical, who has been identified and selected to work with Dr. Fatima Cody Stanford and the **trans-NORC Diversity, Equity, and Inclusion Working Group** to support the NORCs’ efforts to enact programs and initiatives that increase the inclusion and success of scientists from underrepresented backgrounds in academia conducting nutrition and obesity research.
 - **Pilot & Feasibility Grants for Underrepresented Minorities.** The Pilot and Feasibility (P&F) program provides the critical start-up funds for new and innovative projects that emanate from the synergies fostered in the Pennington/Louisiana NORC. The goal of this supplement is to **solicit and fund 2-3 applications from under-represented investigators** in the research field of nutrition and obesity. The selected research proposals will receive funds to support the cost of the proposed research and the use of at least one of our three NORC scientific cores. Three P&F grants have been awarded in December 2021 to:
 - **Melissa Johnson** – “Virtual Reality Nutrition Education Intervention in College Students: A Pilot Study on End-User Knowledge and Behaviors”
 - **Jacob Mey** – “Nutritional Strategies to Enhance Lung Function in Asthmatics with Obesity”
 - **Wagner Dantas** – “Obesity-related mitonuclear imbalance in aged skeletal muscle is restored by exercise training”

All in all, 2021 has been an exceptional year for the Pennington/Louisiana NORC. We are looking forward to more success and high productivity in 2022.

New Awards For Pilot & Feasibility Studies

The objective of the NORC P&F program is to encourage young investigators by providing research support to test innovative hypotheses involving nutritional programming-related research and other pilot studies related to the function of NORC. Below are the most recent P&F winners.

An examination of brown adipose tissue and energy expenditure in infants



Emily W. Flanagan, Ph.D.

Postdoctoral Fellow

Reproductive Endocrinology & Women’s Health

Pennington Biomedical

The developmental origins of obesity begin in utero with the growth and differentiation of fetal adipose tissue. There are two types of adipose tissue with differing functions: white adipose tissue and brown adipose tissue (BAT). Unlike white adipose tissue, BAT functions as a highly thermogenic tissue which protects against hypothermia in the postnatal environment. The presence and amount of BAT in adults is small and variable with a greater amount in individuals with a lower body mass index. The impact of BAT on energy expenditure in adults is debatable and very modest, at best. Yet, BAT may be a meaningful contributor to energy expenditure in neonates (infants <30 days old) given histological characteristics suggesting a capacity for significant thermogenesis. Despite the known properties and physiological relevance of BAT in neonates, the factors that contribute to BAT mass and activity at birth are not known. Moreover, the extent to which neonatal BAT is activated and stimulates thermogenesis at birth has not been studied.

This NORC P&F will examine maternal and neonatal influences on BAT development and quantify the relationship between neonatal BAT and energy

expenditure. Dr. Flanagan is under the advisement of a multidisciplinary team of experts in maternal energy balance (Leanne Redman; PBRC), energy expenditure (Eric Ravussin; PBRC) and BAT (Denis Blondin; University of Sherbrooke). To execute this study, we utilize (a) a novel method of magnetic resonance imaging to assess BAT volume and the lipid to water ratio in BAT (fat signal fraction; FSF) and (b) a state-of-the-art infant metabolic chamber to assess resting energy expenditure under thermoneutral conditions and during a mild cold exposure. Dr. Flanagan and colleagues hypothesize that (1) a mild cold exposure will activate BAT thermogenesis and result in higher rates of neonatal energy expenditure and (2) neonates born to mothers with a lower pre-pregnancy BMI and to women who achieve lower amounts of gestational weight gain will have greater quantity of BAT and a capacity for higher thermogenic activation. The results of this study could elucidate role of BAT on neonatal energy balance and as a protective phenotype against the intrauterine transmission of obesity.

Defining the role of CD36 in the regulation of pancreatic beta-cell function.



Susan Burke Ph.D.

Assistant Professor

Immunogenetics

Pennington Biomedical

Obesity, insulin resistance, and pancreatic b-cell dysfunction are key contributors to the development of type 2 diabetes mellitus (T2DM). Obesity and insulin resistance are associated with consumption of diets that are typically high in sugar and fat content. In the pancreatic islet β -cell, exposure to excess dietary fat promotes excess tissue lipid accumulation and is proposed to alter β -cell function via inflammatory mediators including lipotoxic lipid species, cytokines, and reactive oxygen species.

Loss in β -cell function eventually leads to the development of T2DM.

To date, no in vivo studies have elucidated a direct link between limiting lipid uptake into the cell and pancreatic β -cell function. In this NORC Pilot and Feasibility study, we will employ a novel in vivo model of reduced fatty acid uptake in pancreatic β -cells. We will delete the gene Cd36, which encodes a fatty acid translocase, specifically in the β -cell. This will allow us to test the hypothesis that a reduction in fatty acid translocation into the pancreatic β -cell prevents excess lipid accumulation and inflammatory signaling that is detrimental to islet β -cell insulin secretion. Completion of this project will reveal the critical CD36-dependent events responsible for regulating islet β -cell changes in secretory function during caloric overload, obesity, and insulin resistance.

Characterization of a gut microbiota-centered model of mild cognitive impairment



Rebecca Solch, Ph.D.

Postdoctoral Fellow

Department of Neurology

Tulane School of Medicine

Mild cognitive impairment (MCI) negatively impacts 15-20% of adults 65 years or older. Problematically, MCI has no cure indicating a need for preventative therapies. One such therapy may stem from the gut microbiota as it has the ability to directly influence cognitive function. Further, patients with MCI have a dysbiotic gut microbiota compared to healthy individuals. As a person's gut microbiota is directly modulated by diet, adherence to a nutrient rich diet, such as the Mediterranean diet (MeDi), may reduce the risk of MCI by maintaining gut eubiosis. Therefore, there is a need to explore microbiota-based therapies for prevention of MCI.

This NORC P&F study will elucidate the effects of MeDi-modulated fecal microbiota transplantations on cognitive function, gut microbiota, intestinal and blood-barrier integrity, and immune function in F344 rats. This study will be conducted leveraging the expertise of Dr. Maraganore (Tulane University) and Dr. Engler-Chiurazzi (Tulane University). Animals will be fed a Mediterranean or Western diet, weighed weekly, and have fecal samples collected monthly for 16s rRNA sequencing by Dr. Salbaum (PBRC). After three months on the diet, some groups will receive weekly fecal transplantations for two months. Following, animals will undergo a battery of cognitive assessments (i.e., Y-maze, Morris water maze, radial arm water maze) and be euthanized where blood and tissues will be collected. The results from this study may identify a unique preventative therapeutic for MCI prevention.

Pilot & Feasibility Grants for Underrepresented Minorities

Melissa Johnson, Ph.D.

Assistant Professor
Southern University and A&M College
“Virtual Reality Nutrition Education Intervention in College Students: A Pilot Study on End-User Knowledge and Behaviors”

Jacob Mey, Ph.D., R.D.

Postdoctoral Fellow
Pennington Biomedical Research Center
“Nutritional Strategies to Enhance Lung Function in Asthmatics with Obesity”

Wagner Dantas, Ph.D.

Postdoctoral Fellow
Pennington Biomedical Research Center
“Obesity-related mitonuclear imbalance in aged skeletal muscle is restored by exercise training”

Enrichment Core Updates

Update on T32 Trainees

Pennington Biomedical’s NIDDK supported T32 on Training in Obesity Research began its 18th

consecutive year of funding in 2021. In the past year, four trainees successfully graduated from the program. **Melissa Erickson** was promoted to a Faculty Position at the Translational Research Institute in Orlando, FL. **Christoph Hoehsmann** has also been promoted to a Faculty Position at the Technical Univ. of Munich in Germany and has received a Humboldt Fellowship Award. **Redin Spann** secured an F32 grant on “Central FGF21-mediated control of energy expenditure”. During this time, the program has recruited and appointed three new trainees so that all five positions are filled. The bios below highlight our newest T32 trainees.



Sean Swetledge received his Ph.D. in Biological Engineering from LSU. Dr. Swetledge was appointed to the T32 September 2021 and will pursue research with mentor Heike Muenzberg-Gruening, Ph.D.



Chloe Lozano received her Ph.D. in nutritional epidemiology from the University of Hawaii at Manoa. Dr. Lozano was appointed to the T32 September 2021 and will pursue research with mentor Corby Martin, PhD.

Positions Available – Pennington Biomedical

Postdoctoral Training in Obesity Research

- Premier state-of-the-art research facility
- Internationally-known investigators
- Top 10 place for postdoctoral training
- Benefits & travel

pb Pennington Biomedical Research Center
Louisiana State University

Apply Now at <https://bit.ly/ObesityT32>

Visiting Speaker Seminars

Each year, the Pennington/Louisiana NORC sponsors a series of speakers who are prominent scientists from national and international universities as well as governmental and industrial laboratories. These seminars are available to all NORC participants. Mark your calendars for the Spring 2022 speakers listed below.

| Date | Speaker | Topic/Title |
|----------|--|--|
| March 24 | Ania Jastreboff, MD, PhD Assistant Professor Yale School of Medicine | Neurobiology underlying obesity and the mechanism of anti-obesity medications |
| March 31 | Holly Ingraham, PhD Professor University of California, San Francisco | The ventromedial hypothalamus as a neuroendocrine central relay station controlling both metabolic homeostasis and reproductive behavior |
| April 7 | Matthew Rodeheffer, PhD Associate Professor Yale School of Medicine | Cellular and molecular mechanisms that control adipose tissue mass in both normal and disease states |
| May 26 | Camilo Mora, PhD Associate Professor University of Hawaii | Climate change and its impact on human health |

Save the Date

Below are upcoming events planned by the NORC Enrichment Core. These events are by invitation only.

The **2022 Scientific Symposium** will be held on **April 25th to 26th**. This Annual Symposium attracts world-renowned scientists to Pennington Biomedical and gives them the opportunity to interact and synthesize knowledge on the chosen topic. For 2022, the topic is “Biological & Behavioral Mechanisms of Weight Loss Maintenance”. Co-chairs are Eric Ravussin, Ph.D., Pennington Biomedical and Kevin Hall, Ph.D., NIDDK.

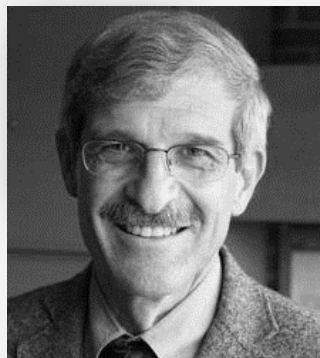
The **2022 Nutrition & Obesity Research Methods in Human Subjects Training Course** will be held on **April 26th to April 27th**. This course will provide members from each NORC an opportunity to convene and learn about the state-of-the-art methods in nutrition/obesity research while experiencing hands-on instruction for data collection and analysis. Participation will also foster new, innovative, and collaborative research initiatives within and between NORC programs.

NORC External Advisory Board

The Pennington / Louisiana NORC would like to express our gratitude and acknowledge the contributions of our external advisory board members. Their Advice and feedback are invaluable to the operations and strategic planning of the center.



Rudolph L. Leibel, M.D.
Professor of Medicine
Columbia University



William Kraus, M.D.
Professor of Medicine
Duke University



Philipp Scherer, Ph.D.
Professor of Cell Biology
UT, Southwestern



Allison Xu, Ph.D.
Endowed Professor
UC, San Francisco