

AGING EXCHANGE

Tracking the Way We Age



Summer 2014

Sleep, Social Engagement, and Inflammation

Scientist Studies the Benefits of Sleep and Social Engagement

Sleep is more than your head hitting the pillow to rest. A good night's sleep may be as beneficial as confiding with a close friend about a problem you face.

What happens when we sleep? Although our eyelids eventually close, the brain activates. Sleep is the brain's time to repair and rid itself of waste. But what if we do not get adequate sleep? What happens to all of the waste? Research at Purdue shows that poor sleep may accelerate the accumulation of extra proteins leading to chronic inflammation.

In an article published in a 2011 issue of the *Annals of the New York Academy of Sciences*, Elliot Friedman of Purdue University examined a triad of causation between sleep, social factors, and inflammatory proteins.

With data from a national sample of 1,229 middle-aged men and women, Friedman hypothesized that poor sleep quality is associated with higher levels of both IL-6 and E-selectin proteins. He also suspected that more time spent investing in quality social engagement would predict lower levels of inflammatory proteins.

Study participants indicated whether they had been

Friedman's research found that not getting enough sleep is associated with high levels of inflammatory proteins.

diagnosed with chronic diseases including: hypertension, arthritis, asthma, diabetes, cancer, and diseases of the gastrointestinal tract, liver, and autoimmune system. Fasting blood samples were assessed for Serum IL-6 and E-selectin.

Friedman's research revealed

that not getting enough sleep causes the body to have higher levels of inflammatory proteins. This is important because inflammatory proteins such as Interleukin 6 (IL-6) and Nuclear Factor Kappa-Light-Chain-Enhancer of Activated B Cells (NF-κB) are linked to the development of disease.

The study controlled for age, marital status, race, education, height, weight, and medications (antihypertensives, cholesterol-lowering, steroid, and antidepressant medications).



*Elliot M. Friedman
Associate Professor
Human Development & Family Studies
and CALC Faculty Associate*

(continued on page 2)

Professor Friedman's research provides compelling evidence that poor sleep quality raises the risk of disease and poor health outcomes.

Prior research also postulated that high levels of social well-being may actually help compensate for those at risk of higher levels of inflammatory proteins due to lack of sleep. Thus, participants' social well-being was assessed using Ryff's Psychological Well-Being inventory. The assessment was based on participants' level of agreement with statements about relationships with peers such as "I know that I can trust my friends, and they know they can trust me."

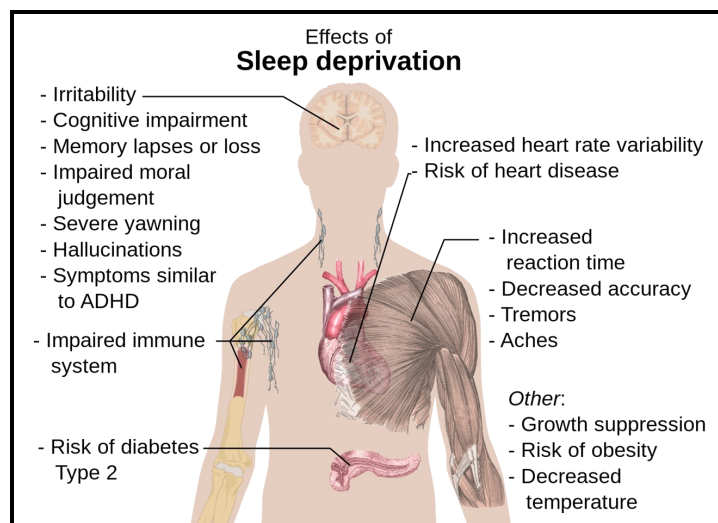
To further assess well-being, participants' positive affect and negative affect was measured using the High Positive Affect and the Depressive Symptoms sub scales from the Mood and Anxiety Symptom Questionnaire (MASQ). Through the use of the MASQ subscales, participants indicated a range of feelings from optimism and cheer to being tired and hopeless.

Each participant was also given a subjective sleep-quality questionnaire. The questionnaire evaluated subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, and the use of sleep aids and medications.

Participants wore wrist actigraphs for seven consecutive nights that recorded their movement. Actigraphs were used to determine when participants started trying to fall asleep (bedtime) and when they awoke in the mornings (rise time).

Participants also logged bed time and rise time into sleep diaries. From the actigraphs' data, the following variables were calculated:

- *Total Sleep Time = total amount of time asleep from bedtime to rise time*
- *Sleep Efficiency = percent of time asleep between bedtime and rise time*
- *Latency to Sleep Onset = time from bedtime to first sleep interval.*



Retrieved from: nourishholisticnutrition.com

Results of the study showed that relationship between subjective sleep quality and inflammation varied for men and women. The study found that:

- *Longer sleep duration, shorter latencies to fall asleep, and greater sleep efficiency were associated with lower levels of IL-6 in women but not men.*
- *The relationship between subjective sleep and inflammation was not as prominent in males with more positive social engagement.*
- *Greater subjective sleep quality, greater sleep efficiency, and reduced sleep latency in men were associated with greater social engagement.*

Friedman's work found that "social engagement may buffer against the proinflammatory effects of poor sleep and that good sleep may compensate for low levels of social engagement, particularly in men."

We've long known of the health benefits of quality sleep, and Friedman's research identifies it as protection against chronic inflammation, especially for women.

Megan Klotz

In January 2014, the Centers for Disease Control and Prevention (CDC) reported 50-70 million American adults have a sleep or wakefulness disorder.

Freeman Receives Exceptional Teaching Award

2014 is Banner Year for Professor

On Tuesday, April 1, Jennifer Freeman, assistant professor of toxicology, received the honor of being named a recipient of the 2014 Exceptional Early Career Award.

The award was created by the Office of the Provost and the Murphy Award selection committee. The award recognizes outstanding undergraduate teaching among early career, tenure track faculty at Purdue University.

Recipients “dedicate time to student learning while still committing to the research and scholarship requirements of the tenure track.” In addition to her newly acclaimed title, Freeman also received \$5,000 cash award and additional funding for her department.



Jennifer Freeman
Assistant Professor of Toxicology and
CALC Faculty Associate

Photo Credit: Mark Simmons

Beyond classroom instruction, Jennifer Freeman has also served as a mentor to undergraduate students in Purdue’s College of Health and Human Sciences. Many of Freeman’s students have attained advanced education through graduate and professional schools, including medical and veterinary school. In addition, she has created an undergraduate course, Essentials of Environmental Occupational and Radiological Health Sciences, and a graduate level course, Advanced Techniques in Molecular Toxicology.

On April 17th, Purdue Today reported Freeman saying, “I look forward to many more years of interacting with students and aim to provide unique opportunities during their educational experience that will assist them as they work toward achieving their educational goals.”

In late April, 2014, the Purdue University Board of Trustees approved Dr. Freeman’s promotion to Associate Professor. The Center on Aging the Life Course is honored to have dedicated and passionate faculty that focus on academic and scientific excellence. Of note, Dr. Freeman was recently promoted to associate professor of health sciences, effective August 18, 2014.

Live as if you were to die tomorrow.

Learn as if you were to live forever.

Mahatma Gandhi

What Is a Good Diet?

What is a *good* diet? Over the years we have learned of numerous fad diets; they come and go. To partly counteract the “dietary confusion,” scientists and policy makers have offered guidelines for the nation. Four sets of guidelines are summarized in the timeline shown at right (pages 4-5). As depicted in the guidelines, even scientists’ definition of a good diet continues to evolve.

The United States’ first set of dietary guidelines were published in 1894. Those guidelines were based on 7 food groups. Americans were told to eat some food each day from all 7 groups.

In 1941, the United States Department of Agriculture (USDA) developed the Recommended Dietary Allowances (RDAs) specifying the daily dietary nutrient intake for healthy persons at each life stage.

With increased development and diagnosis of chronic disease among the US population, the Food Guide Pyramid was created in 1992. The modified Food Pyramid—with stairs connoting physical activity—appeared in 2005.

The guidelines recently invoked the icon of a dinner plate to depict requirements. Plus, for the first time, the graphic included protein consumption. This is because research has recently documented that inadequate protein consumption has been linked to sarcopenia, increased risk of falling, and inability to perform activities of daily living.

With all the changes taking place since 1894, one wonders if the RDAs and EARs (Estimated Average Requirement) are within our dietary parameters. (EAR is the average daily nutrient intake to meet the requirement for half of the population.)

Aging and Dietary Guidelines

In January 2014, the *American Journal of Clinical Nutrition* published a research article by Wayne Campbell, Professor of Nutrition Science and Faculty Associate of CALC at Purdue University. Campbell and his colleagues helped answer the question: What is a good diet?

For healthy adults, the current USDA EAR for protein is 0.66 (expressed as grams of protein per kilogram of body weight per day [g/kg/d]); and the RDA is 0.80 g/kg/d.

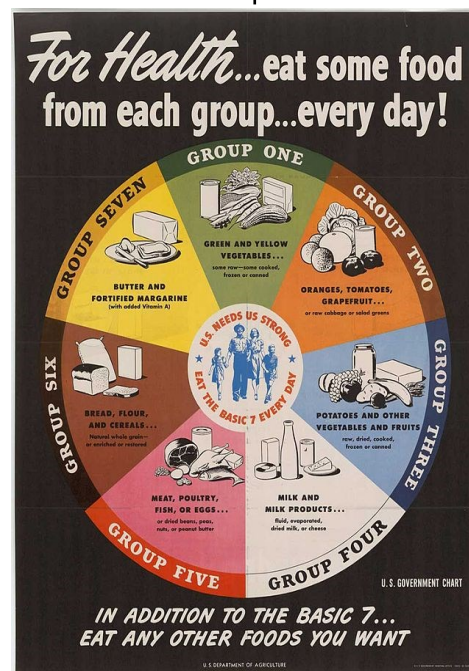
Campbell and colleagues questioned these dietary reference intakes for older

adults. Previous studies fueled the debate about current protein requirements, and the team sought an innovative way to address the concern.

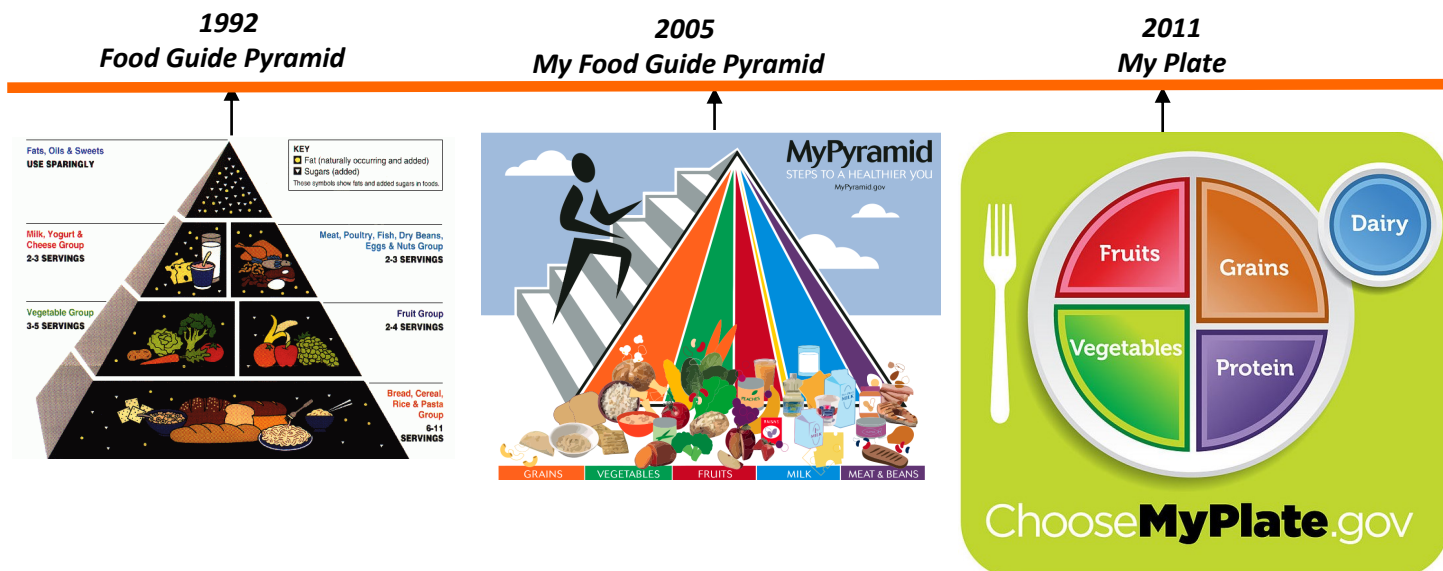
Joining Campbell on the project was George McCabe, Professor of Statistics and CALC Faculty Associate, to use a new method to evaluate protein amounts in vulnerable populations: Invasive Indicator Amino Acid Oxidation (IAAO) technique.

Prior methods of evaluating protein amounts were not ideal for vulnerable populations including children and older people. Methods were developed with data from the younger population and therefore were not tailored to the metabolic and physiologic changes of an older population.

1894 First USDA Dietary Guidelines



Wayne Campbell
Professor of Nutrition Science and
CALC Faculty Associate



Participants of the study included 6 octogenarian women (age 80-87) residing in the Lafayette area. University Place, a local retirement facility in West Lafayette, served as the clinical testing sight. Characteristics of the women include: body mass index less than 30, non-smoker, not incontinent, physically active, and no medical diagnosis, allergies, or prescribed medications that would influence protein or energy metabolism. Participants were instructed to stop taking any nutritional supplements.

Study participants completed a 3-day protocol 7 times within 3 months. On days 1 and 2 of the protocol, the women consumed an adaptation diet developed using Pronutra metabolic feeding study software. Meals were prepared and distributed by the Indiana Clinical Research Center Bionutrition Facility at Purdue University.

The adaptation diet on days 1 and 2 consisted of 30% fat, 1 g/kg/d of protein and varying amounts of carbohydrates (the quantities of each food item were customized for each participant).

Participants fasted for 10 hours prior to the day 3 testing. On day 3, they consumed 8 isoenergetic testing-day drinks that included tracer proteins. The 8 drinks were consumed over an 8-hour testing period. Each 3-day protocol was separated by at least 1 week of time.

Campbell assessed the mean protein requirement by assessing the depletion of the protein ^{13}C in the breath and urine samples of each participant as indicated by the tracer proteins. Breath samples were analyzed using

continuous-flow isotope ratio mass spectrometry. Urine samples were analyzed using gas chromatography-mass spectrometry analyses.

The team found the mean protein requirement for older women to be 0.85 g/kg/d. This means that the optimal protein requirement is actually 29% higher than the current EAR guidelines.

Campbell's work reveals a need to continue research that is tailored to the older adult population in regard to protein consumption. The research also demonstrated that it is feasible to use the IAAO technique with older adults.

Goals for future research by the team include minimally-invasive, short-term studies and development of long-term studies tailored to vulnerable populations.

What is a good diet?

For many older adults, Campbell's research calls for a higher protein RDA to maintain optimal health. Thus, USDA guidelines may change again to ramp up protein consumption among older adults.

Megan Klotz

*Be careful about reading health books.
You may die of a misprint.
Mark Twain*

Scholars in the Spotlight Symposium



From left to right: Wai Chan, Marwa Nouredin, Anusha Sundarrajan, Kaitlin Johnson

The Center on Aging and the Life Course hosted CALC *Scholars in the Spotlight* on Friday, April 4th. Although CALC has long held a spring luncheon and featured both faculty and student presentations, the Scholars in the Spotlight format was integrated into the event beginning in 2012. Professor Jeffery Haddad, Faculty Associate from Health and Kinesiology, helped organize the first such effort to highlight graduate student research.

The breadth of CALC's research expertise was exemplified in the presentations of four graduate students:

- Wai Chan, Ph.D. candidate in the Department of Human Development and Family Studies, presented *"To Save or Not to Save: How Do Personality Traits Explain Saving for Retirement?"*
- *"Medication Management Experiences of Informal Caregivers of Older Adult Care-Recipients"* was presented by Marwa Nouredin, doctoral student in the Department of Pharmacy Practice.
- Anusha Sundarrajan, doctoral student within the Speech, Language and Hearing Sciences Department, presented her work *"Effects of Aging on the Respiratory*

and Laryngeal Systems."

- *"Moving In, Moving Out, and Staying with Mom: Continuity and Change in Adult Children's Coresidence with Older Mothers"* was presented by Kaitlin Johnson, graduate student in the Sociology Department.

Laura Sands, Katherine Birck Professor of Nursing and Director of Research for Purdue School of Nursing, was the keynote speaker of the morning and drew attention to the unmet needs of Activities of Daily Living (ADL) assistance among older adult patients through her work, *"Predisposing and Precipitating Risks for Unmet Need for ADL Assistance."*

Sands explained that nearly 70% of adults age 65 and older will eventually need assistance in completion of their ADLs. The average number of years that an individual will need supportive care is 3 years.

The current annual cost of Medicaid for long term care needs is \$131 billion.



Dr. Sands presenting information regarding unmet needs in patient care.

As the cost of ADL assistance and supportive care increases, so does the need to resolve unmet needs of ADLs.

20-30 % of older adults do not have enough help with completion of ADL activities

injured from falling. Of the older adults needing ADL assistance, 36% reported

discomfort from not bathing.

An unmet need is defined as “not completing at least one ADL task in a timely fashion because no one was there to help and it was too difficult to complete by one’s self.”

Common ADL needs not being met include bathing, eating, dressing, grooming, toileting, transferring and getting around inside. Sands noted that 20-30% of older adults simply do not have enough help with the completion of needs with their daily personal care.

The effects of unmet needs are seen across many communities. Among community–living older adults with disability or difficulty in completion of ADLs, 30% report their needs are unmet. Medicaid home and community– based care patients report 19% of their ADL needs as unmet.

The consequences of unmet needs are extensive. During the past year, 82% of older adults needing ADL assistance experienced unmet needs; 69% were

In addition to these problems, these patients also reported skin problems due to lack of help with toileting and going hungry due to lack of help with food preparation and feeding.

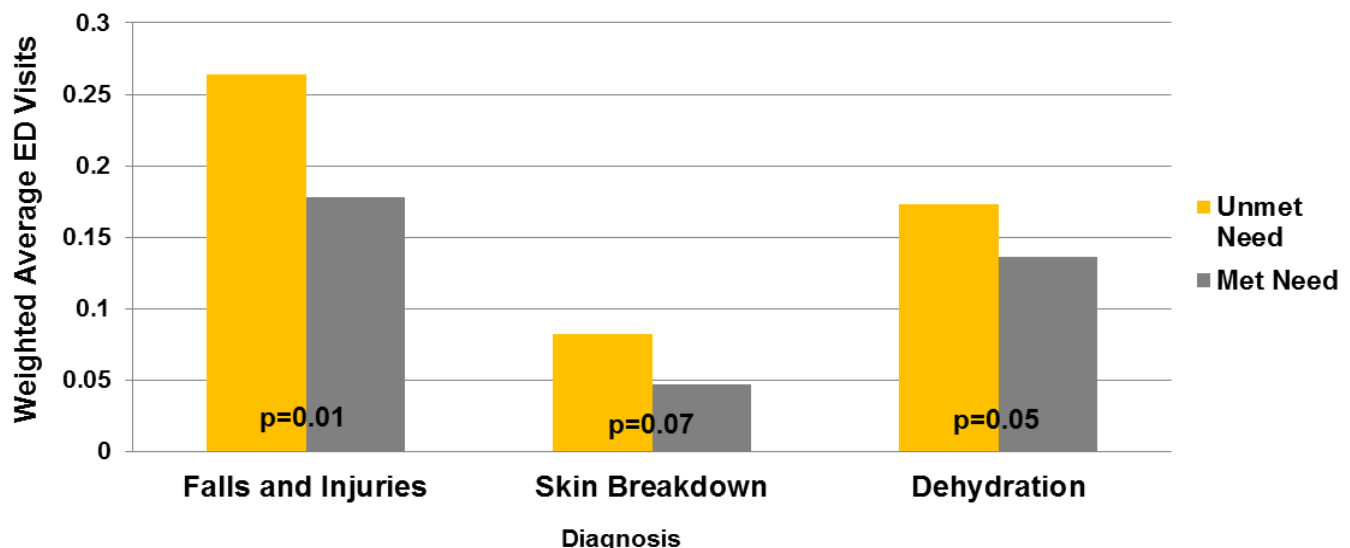
Sands also found that patients with an unmet need had a 19% higher Emergency Department (ED) admission rate. She derived these estimates with data from National Long Term Care Survey (NLTC) and Medicare inpatient claims.

This higher use of the ED equals about 129,000 excess ED visits related to unmet need for ADL disability. Because of these unmet needs, twice as many older adults reported symptoms of depression.

Professor Sands’ research points to the direct relationship between the caregiver and the patient. A stronger, more personal relationship between the two is associated with greater met needs.

Clinicians who are most likely to have contact with

Unmet ADL Need and Emergency Department (ED) Visits (Source: Laura P. Sands)



community-living disabled adults are primary care providers. The busy schedule of a primary care provider inhibits them from properly screening older patients for ADL disability.

As unmet needs are resolved, evidence points to improved health outcomes. To ensure resolution of the problem, we can better utilize medical health records to understand the unmet needs of patients.

Sands emphasized the need to develop a *risk identification system* that could work in the context of electronic health records to reduce the burden of

screening by primary care providers. Accurate identification of those at greatest risk is the first step to address the unmet need of older adults.

Following Sands' presentation, guests enjoyed a luncheon and comments regarding new initiatives during the past year from Ken Ferraro, CALC Director.

Megan Klotz

Successful and timely completion of ADLs is necessary for health and survival.

M. Powell Lawton



Left: (from left to right) Marwa Noureldin, Laura Sands, Anusha Sundarrajan

Right: CALC guests enjoy the luncheon served in the Anniversary Drawing Room of the Purdue Memorial Union

Congratulations 2014 Graduates

May

Connie Carunchia Cole: Doctor of Nursing Practice and Minor in Gerontology

August

Wai Chan: Dual-title PhD in Human Development and Family Studies and Gerontology

Christine E. M. Keller: PhD in Interdepartmental Nutrition Program and the Minor in Gerontology

Karis Pressler: Dual-title PhD in Sociology and Gerontology

Lindsay R. Wilkinson: Dual-title PhD in Sociology and Gerontology



Susannah Gordon: Moderation & Nutrition

Growing up in Georgia, Susannah Gordon enjoyed the warm, humid weather and the southern atmosphere and hospitality. As a young girl and into her adulthood, Gordon saw that southern hospitality exemplified in her grandparents. The gift of her grandparents' wisdom, stories and views on life helped Susannah develop a special respect and admiration for older adults. "The way they live their life with gratitude, hard work, and modesty is something I have always respected and can be attributed to their generation and age."

With an aging population, Susannah saw the importance in studying gerontology. She sees aging as a positive and important process in life.

At the University of Georgia, Gordon earned two undergraduate degrees in Psychology and Dietetics with the intention of becoming a registered dietitian. While pursuing her aspirations as a registered dietitian, she successfully started an internship and completed her Master's degree in Foods and Nutrition. While at the University of Georgia, Gordon further embraced her passion of gerontology by beginning a certificate in gerontology program. Subsequently, Susannah set her sights north toward West Lafayette, Indiana.

Once at Purdue, Susannah started working with Professor Wayne Campbell in the Department of Nutrition Science researching dietary protein intake in older adults. Since coming to Purdue, Susannah says that the experience has been an exciting ride. Nearly every crossroads she meets is full of new information that drives her to continue toward her goal. She recently presented some of her research at the Southeastern Student Mentoring Conference in Gerontology and Geriatrics, which gave her a chance to visit with Leonard Poon, a mentor from her days at the University of Georgia.

Eventually, Susannah will be conducting a protein patterning study where she will research the effects of weight loss through diet counseling and exercise. Intervention groups will consume an even distribution of protein throughout the day (30mg at 3 meals) while other participants will consume a diet with more protein in the evening, similar to what most Americans typically consume.

Down the road, Susannah hopes to find herself teaching future dietitians. As a professor, she will emphasize the importance of moderation between diet and exercise. In doing so, she hopes to break the oversimplified list of do's and don'ts of dieting. She says, "Find what works for you." Individualization is key to success in both your profession and throughout the life process.



*Susannah Gordon, M.S.
Ph.D. Student,
Nutrition Sciences*



Susannah Gordon and Dr. Poon

Our food should be our medicine and our medicine should be our food.

Hippocrates

CALC Initiative for Graduate Student Research

In an effort to strengthen Purdue's support of graduate students affiliated with the Center on Aging and the Life Course, Ken Ferraro recently announced the creation of **CALC Summer Research Awards**.

Ferraro explained that "as budgets have tightened at Purdue and many other state-assisted universities, we need additional ways to support graduate student research and mentoring during summer."

The goal of the program is to support summer research assistantships, which could be either discipline based or interdisciplinary (cross-training). The funds could also be used to support graduate student participation in research-related workshops at other universities or institutes.

As Purdue seeks to increase summer enrollment, many graduate students will be offered summer teaching opportunities. Thus, now is an ideal time to provide research support to graduate students to enhance their scientific expertise.

"I have been impressed with the support raised during the quiet phase of the campaign", remarked Ferraro. "Our faculty associates, alumni, and friends have responded to this opportunity to aid the research expertise of the next generation of scholars."

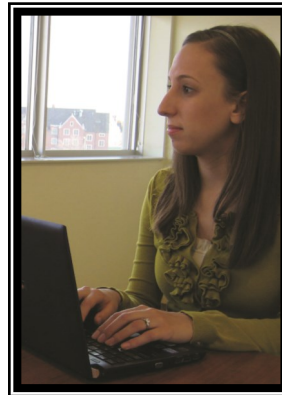
Nick Turiano (dual-title PhD, 2012) explained why he contributed:

Contributing to the CALC Summer Research Awards is a great opportunity to provide graduate students with some financial assistance over the summer when funding is not always available. As a graduate student myself just a few years ago, I recall the financial strain associated with summer. Alleviating such concerns enables one to focus on research and learn cutting-edge methods to investigate optimal aging.

Min-Ah Lee (sociology PhD and gerontology minor, 2007), associate professor of sociology at Chung-Ang University, South Korea, explained her motivation to support this initiative:

CALC holds an unforgettable place in my life. The experiences I had at CALC formed a foundation for my academic activities and achievements. I believe that the Center will continue to be a great place for Purdue students studying aging. I am pleased that I can make a small contribution to the CALC Summer Research Awards.

To support the CALC Summer Research Awards, please use the form on page 11 to contribute (check made out to Purdue Foundation) or our secure online portal at www.purdue.edu/aging (use the "About Us—Donate" tab).



Lindsay Wilkinson recently completed her dissertation examining the health consequences of financial strain among older people (2014 dual-title PhD: sociology and gerontology).



Brittney Muir studies balance and gait to prevent falls in later life (dual-title PhD student, health and kinesiology and gerontology).

If your actions inspire others to dream more, do more and become more, you are a leader.

John Quincy Adams

CALC Adult Research Subject Registry

The Center on Aging and the Life Course recently created an Adult Research Subject Registry (ARSR) to assist in the recruitment of participants for research conducted by the Center's Faculty Associates and graduate students.

CALC is collecting basic information about persons (age ≥ 50) who have expressed interest in participating in research on aging. Information in the ARSR will be strictly confidential, available only for approved CALC research teams.

As part of the registration process, volunteers will be asked to provide preferred method of contact, along with basic demographic and health information, which will be used to efficiently match subjects with appropriate studies. Participants must be at least 50 years old and community dwelling (non-institutionalized).

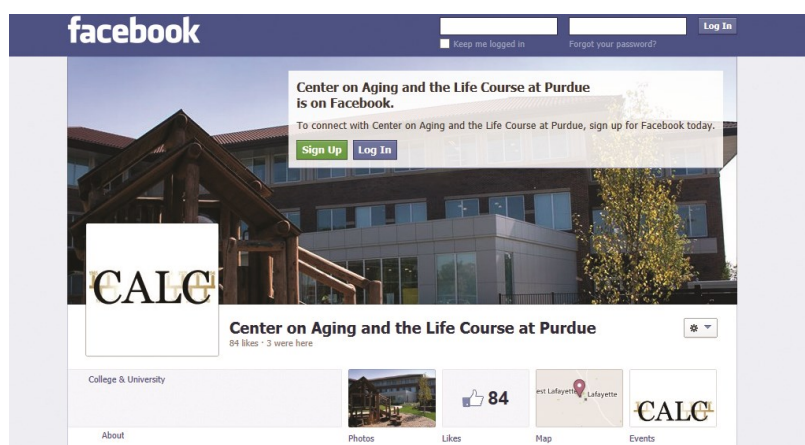
If interested, contact Ann Howell by email (calc@purdue.edu) or phone (765-494-9692).

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Comments? Email: calc@purdue.edu
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UPCOMING EVENTS

When	Where	Speakers	Presentation
September 5 8:00am—noon Fall Symposium	Stewart Center 218 A-D	Avenues to Optimal Longevity S. Jay Olshansky , Professor of Public Health, University of Illinois at Chicago Rafael de Cabo , Senior Investigator, National Institute on Aging	 <i>In Pursuit of the Longevity Dividend</i> <i>Dietary Interventions for Healthy Aging</i>
October 3 12:30 - 1:30pm	Stone B2	Jennifer L. Freeman , Associate Professor of Toxicology	<i>Using the Zebrafish Model System to Define Mechanisms of Environmental Chemical Toxicity in the Developmental Origin of Adult Health and Disease Paradigm</i>
November 5-9	Washington, DC	Gerontological Society of America Annual Meeting	<i>Making Connections: From Cells to Societies</i>
November 21 12:30 - 1:30pm	Stone B2	Sherylyn Briller , Associate Professor of Anthropology	<i>Strengthening the Connections: Applying Anthropology to Contemporary Life Course Studies</i>