University of Pittsburgh
Older American's Independence Center
2015-16 Directory

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Section I. Description of Center

Balance disorders in older persons are common, disabling and complex. In order to prevent and treat these disorders, a concentrated, multidisciplinary effort to understand causes and consequences, and to develop innovative treatments, is needed. The team of investigators at Pittsburgh offers complementary expertise, outstanding research productivity, and ongoing studies to address this need through a Claude D. Pepper Older Americans Independence Center. This program includes investigators from medicine, bioengineering, rehabilitation, epidemiology/public health, biostatistics, psychology, pharmacology, biology, imaging, informatics, and health services research. Our long range goals are: to address the critical need to improve mobility, balance, and falls risk, both through improved understanding of their causes and through development of preventive and therapeutic interventions.

Our specific aims for the current cycle are to:
1. Promote multidisciplinary research into the causes, consequences and treatment of age-related changes in mobility and balance.
2. Building on the exceptional expertise of our research team, extend our successful work into two new high potential areas: a) the biologic and physiologic causes and clinical consequences of *interactions between multiple body tissues* (nerve, muscle, bone and fat) as they impact on aging, mobility and balance; and b) *community and health system uptake* of interventions to enhance mobility and balance.
3. Train young investigators from multiple disciplines in an intellectually vibrant, collaborative environment.
4. Serve as a resource and partner to investigators, research programs, institutions, OAICs and the public.

The Program has 6 Cores:
- Leadership/Administration Core
- Pilot Exploratory Studies Core
- Research Career Development Core

- Clinical Populations Outcomes Core
- Integrative Systems Core
- Data Management, Analysis and Informatics Core

Training support is provided directly to Pepper Scholars and also to trainees in related programs.

Research strategies to achieve OAIC goals. Our strategies to achieve these goals are:
1. Use Resource Cores to share expertise among projects and investigators.
2. Use pilot and developmental funds to extend existing studies and develop new studies.
3. Promote and reward collaborative multidisciplinary teams of investigators with complementary expertise by prioritizing them for funds and support
4. Encourage new partnerships with highly productive investigators and programs by offering to partner with our expertise and resources.
5. Reward development of new methods and techniques.
6. Facilitate the use of a common set of core measures of mobility, balance and falls in human studies so results can be merged or compared.
7. Leverage resources by collaborating with other Centers at Pitt, other OAICs, and Centers around the US.
8. Sponsor seminar series to promote general awareness of expertise and resources, review progress in ongoing projects and facilitate new collaborations.
9. Support the new OAIC KL2 career development program with salary funded Pepper Scholars in addition to resource support for Novice, Transition to Independence, and Visiting Scholars, with a focus on multidisciplinary teamwork, thematic knowledge, and specific skills.
10. Promote national discussion through programs at national meetings and other dissemination methods.
11. Provide administrative infrastructure, intellectual leadership, and oversight.

Section II. Research, Resources and Activities

A.   Primary Cores

Leadership/Administration Core (LAC)
Core Leader: Susan L. Greenspan, MD, Professor of Medicine, 3471 Fifth Avenue, Suite 1110 Kaufman Bldg, Pittsburgh PA 15213, PH: 412-692-2477, Fax: 412-692-2486

Core Co-Leader: Anne Newman, MD, MPH, Professor and Chair, Department of Epidemiology, 130 DeSoto Street, Room A529 Crabtree Hall, Pittsburgh, PA 15261, PH: 412-383-1302, Fax: 412-624-3737

Administrator: Megan Miller, BS, CBDT, 3471 Fifth Avenue, Suite 1110 Kaufman Bldg, Pittsburgh PA 15213, PH: 412-692-2477, Fax: 412-692-2486

        The Leadership Administration Core is responsible for the overall coordination, monitoring, compliance and reporting functions of the OAIC. It promotes internal coordination, institutional interactions and external relationships. It supports the External

Advisory Committee and sponsors a seminar series, annual retreat, website, publications committee, visiting professor series, topical workgroups, grant planning retreats and national and local conferences.

Our specific aims are to:
1. Foster communication and multidisciplinary collaboration among OAIC investigators, cores and projects.
2. Promote increased attention and involvement in our work with relevant investigators and research programs in and outside the University of Pittsburgh.
3. Represent the OAIC to the University through an Institutional and Community Advisory Boards.
4. Represent the OAIC to other OAICs, the larger academic, NIH, clinical and lay communities.
5. Through the External Advisory Committee, maintain independent oversight of OAIC processes, resources and progress toward goals.
6. Through the External Advisory Committee and ad hoc reviewers, provide independent oversight to the pilot, developmental projects and Pepper Scholar programs.
7. Through the RCDC Advisory Committee provide oversight for the RCDC Scholars program.
8. Establish and operate a Safety Monitoring Board for all OAIC human studies.
9. Sponsor a Research Seminar series, an Annual Retreat, a Visiting Professor Series, Workgroups, publication/communication committee, formal grant reviews, and new partnership initiatives.
10. Increase basic and translational research partnerships.
11. Maintain meticulous financial records.
12. Provide administrative support and oversight for the RCDC, PESC and three research cores.
13. Promote quality and timeliness in all OAIC activities.
14. Collaborate outside the Institution for OAIC related themes.

Pilot Exploratory Studies Core (PESC)
Core Leader: Joseph Hanlon, PharmD, 3471 Fifth Avenue, Suite 500 Kaufman Bldg, Pittsburgh PA 15213, PH: 412-692-2364

The goal of the Pilot/Exploratory Studies Core (PESC) of the Pittsburgh OAIC is to promote and fund innovative multidisciplinary pilot research in the topic areas of mobility, balance and aging and their interfaces. The expected outcomes for funded pilot studies are their successful completion in a timely manner, that the findings be presented at a national scientific meeting and submitted for publication in the peer review literature. Moreover, the findings from these pilot studies are expected to support the development of mentored career development awards and independent federally funded grant applications.

The Specific Aims of the PESC are to:
1. Promote innovative multidisciplinary research on mobility, balance and aging
2. Encourage supplements to ongoing studies

3. Promote innovative techniques and methods for research on mobility, balance and aging
4. Partner with other UPITT groups [i.e., Clinical and Translational Science Institute (CTSI) and Aging Institute] that also offer pilot study awards to increase overall funding for individual pilot projects
5. Promote, evaluate, and select for funding Standard pilot projects, Small pilots, and Developmental projects
6. Conduct post-award processes (e.g., monitor adherence to ethics, safety, privacy, tracking of subsequent productivity and other related matters) for Standard, Small RCDC pilot projects, and Developmental projects

See section II. C. Description of Current Pilots

Research Education Program (REC)

Core Leader: Susan L. Greenspan, MD, Professor of Medicine, 3471 Fifth Avenue, Suite 1110 Kaufman Bldg, Pittsburgh PA 15213, PH: 412-692-2477, Fax: 412-692-2486

Core Co-Leader: Doris Rubio, PhD, Professor of Medicine, Biostatistics, Nursing and Clinical and Translational Science, 200 Meyran Avenue, Suite 200, Pittsburgh, PA 15213, PH: 412692-2023, Fax: 412-246-6954

The goal of the Research Education Program (REC) of the Pittsburgh Older Americans Independence Center (OAIC) is to provide a comprehensive, individualized career development program to prepare future investigators for mobility, balance, and aging research. Our ultimate goal is to develop highly qualified investigators to conduct high quality and high impact research in the field of mobility, balance, and aging and who will become leaders in this field nationally and internationally. We continue to improve our programs with input from our trainees, mentors, Executive Committee, and External Advisory Committee.

Our specific aims are to:
1. Promote careers in mobility, balance, and aging research for Pepper Scholars (junior faculty who have achieved an initial level of expertise and productivity and have salary support from OAIC funds for 2-3 years).
2. Promote careers of Novice (mentees in the initial levels of training) and Transition to Independence investigators (those who have received independent career awards) whose salary sources are from outside the OAIC.
3. Provide structured career development through mentored multidisciplinary research experiences, research and career development seminars, retreats, and formal didactic programs for basic and clinical research skills through the Clinical and Translational Science Institute education programs.
4. Promote translational and cross-training between clinical and basic science.
5. Coordinate access to experienced mentors.
6. Provide feedback, career guidance, and support to trainees and mentors and advise trainees on their training and career development.
7. Oversee the promotion, recruitment, selection, monitoring, and evaluation of trainees and the program.

8. Provide financial support for trainees through stipends, pilot funds, and additional resources.
9. Manage RCDC resources.
10. Collaborate with other cores and units within and outside the institution for OAIC related themes.

B.   Research Support Cores

Clinical Populations Outcomes Core (CPOC)

Core Leader: Steven Albert, PhD, Professor and Chair, Department of Behavioral and Community Health Sciences, 208 Parran Hall, 130 DeSoto St, Pittsburgh, PA 15261, PH: 412-624-3102

Core Co-Leader: Jennifer Brach, PhD, Associate Professor, Department of Physical Therapy, 222 Bridgeside Point 1, Pittsburgh PA, 15213, PH: 412-383-6533

The Clinical and Population Outcomes Core (CPOC) provides recruitment, cohort study resources, and clinical research expertise to promote a multidisciplinary approach to the assessment of mobility and balance in OAIC clinical research studies.

Our specific aims are to:
1. Engage older adults from the community and long-term care settings in research.
2. Provide access to ongoing cohort studies, specimens, clinical trials and existing databases.
3. Provide expertise in clinical assessment methodology by providing a standardized set of forms to promote a common data set of core measures for mobility, balance, and falls.
4. Utilize noninvasive, portable technology to examine mobility, balance, and physical activity in clinics and in the field through our novel mobile laboratory.
5. Provide access to space and equipment for OAIC related studies with our SMART Center.
6. Support the research training mission of the Pepper Center.
7. Evaluate the functions and productivity of the Core and manage its productivity.
8. Collaborate with all the other cores and units within and outside the institution for OAIC related themes.

CPOC Developmental Project 1: Refinement of an Interactive Voice Response (IVR) Phone System for Fall and Physical Activity Assessment during a Randomized Clinical Trial of Group-Based Exercise
PI's: Jennifer S. Brach, PhD, PT; Steven Albert, PhD; Bethany Barone Gibbs, PhD.

Significance: Fall reduction is a focus of the OAIC and PCORI. An efficient and valid tool for fall assessment is needed. A challenge for public health is to reduce falls without reducing physical activity; therefore any fall assessment should also consider physical activity. We developed an Interactive Voice Response (IVR) phone system to assess falls and physical activity and have implemented this system within a statewide fall prevention

program. Hypothesis: Reported physical activity and falls, as measured by the IVR system, will be positively correlated with an objective measure of physical activity (i.e., Actigraph accelerometer recording). Approach: The IVR system is an automated monthly calling system which generates two calls each day for up to 8 days until the phone is answered and the interview completed. Currently the automated call elicits whether a person has fallen, weekly physical activity, hospitalization, and emergency department use in the prior 3 days. We will add the IVR system to our currently funded PCORI trial (Brach PI), which will examine the effectiveness of the "On the Move" exercise program. To validate the IVR system measurement we will compare the weekly physical activity data obtained from the IVR to an objective measure of physical activity (Actigraph accelerometer – worn for 7 days) and established measures of mobility and physical function.

Integrative Systems Core (ISC)
Core Leader: Caterina Rosano, MD, MPH, Associate Professor of Epidemiology, 130 N. Bellefield Street, Room 507, Pittsburgh, PA 15213, PH: 412-383-1294, FAX: 412-383-1308

Core Co-Leader: J. Timothy Greenamyre, MD, PhD, Professor of Neurology, Chief, Movement Disorders Division, 3471 Fifth Ave, Suite 810 Kaufmann Medical Bldg, Pittsburgh, PA 15213, PH: 412-692-4920

Problems of mobility and balance in the aged require multidisciplinary study because they are complex and multifactorial. Advances require integrating expertise and technical resources from biomechanics, physiology, neural control of movement and biology. Thus, the goal of the Integrative Systems Core (ISC), previously referred to as the "Technology" Core, is to provide integrative, multidisciplinary knowledge, skills and techniques that foster an understanding of the biomechanical, structural, functional, physiological and biological influences on age-related mobility and balance.

The Specific Aims of the Integrative Systems Core are to:
1. Provide expertise through use of an integrative systems approach spanning neuroimaging, biomechanics, physiology and biology.
2. Provide consultation to investigators about existing infrastructure and facilitate the use of laboratories.
3. Coordinate and prioritize the utilization of resources within the Core.
4. Develop new technologies and integrative, complimentary approaches for investigators.
5. Support the research training mission of the Pepper Center.
6. Collaborate with other cores and units within and outside the institution on OAIC theme-related activities.

ISC Developmental Project 2: The Aging Brain and Environmental Negotiation in Older Adults
PI: Andrea Rosso, PhD (Epidemiology); Co-I's: Caterina Rosano, MD (Epidemiology); Howard Aizenstein, MD, PhD (Psychiatry); Jennifer Brach, PhD, PT (Physical Therapy); Ted Huppert, PhD (Bioengineering)

Significance: Community mobility, the ability to maintain independence outside the home, is determined by many factors beyond functional and cognitive status and includes environmental factors. While mobility research has focused on individual gait and CNS contributions by using dual-tasking paradigms, few have included real world challenges that reflect environmental limitations of mobility in the elderly. This DP applies a translational approach to bring real world challenges into the laboratory setting in order to further our understanding of mobility control while being exposed to stimuli and challenges that are similar to those experienced in the community. We anticipate that the neural mechanisms involved in negotiating environmental conditions are different than those involved with steady-state gait in environmentally sterile conditions. This experimental paradigm may also be used in the future to test the ability of interventions to improve community mobility. Hypothesis: Exposure to real world challenges will negatively affect gait characteristics (e.g. speed, variability) of older adults compared to unchallenged walking. Older adults with the least amount of difficulty with these tasks will be those who have the greatest prefrontal activation as measured by near-infrared spectroscopy (NIRS). Approach: The goal is to recreate in the lab characteristics of the community environment that are typically experienced as challenges or obstacles to mobility (for example: uneven surfaces, obstacles, noise). A second goal is to study changes in mobility characteristics and brain function in participants negotiating community challenges while wearing a wireless NIRS system and walking on a gait mat. We will test 20 elderly adults recruited from the Pepper registry and compare gait performance, executive function, structural MRI, and NIRS activation during unchallenged and challenged conditions.

Data Management, Analysis and Informatics Core (DMAIC)
Core Leader: Subashan Perera, PhD, Associate Professor of Medicine, 3471 Fifth Ave, Suite 500 Kaufmann Medical Bldg, Pittsburgh, PA 15213, PH: 412-692-2365

Core Co-Leader: Doris Rubio, PhD, Professor of Medicine, Biostatistics, Nursing and Clinical and Translational Science, 200 Meyran Avenue, Suite 200, Pittsburgh, PA 15213, PH: 412692-2023, Fax: 412-246-6954

The overarching goal of the Data Management, Analysis and Informatics Core (DMAIC) is to continue to provide a central source of expertise and services by a team of faculty and staff familiar with the theme and methods used in the Pittsburgh OAIC. Services are most effective when they are provided by personnel intimately familiar with the unique issues of the theme, its special research questions, methods, populations and measures. We will continue to achieve increased efficiencies due to standardized data entry and management and quality control processes across studies. In addition, we provide special expertise required to address the unique issues involved in studying balance and mobility in older adults, such as methods for falls surveillance, informative censoring and management of related missing data, and novel application of complex techniques for quantifying subtle features of gait.

Our specific aims are to:
1. Meet data management requirements of Pittsburgh OAIC PESC, RCDC, DPs and EPs
2. Support quantitative analysis needs of Pittsburgh OAIC PESC, RCDC, DPs and EPs.
3. Provide informatics expertise to Pittsburgh OAIC projects.

4. Support the training mission of the Pittsburgh OAIC with Pepper Scholars and Pepper trainees.
5. Develop new techniques and novel application of existing methods to address OAIC theme-related methodological challenges.
6. Collaborate with other cores and units within and outside the institution on OAIC theme-related activities.

DMAIC Developmental Project 3: Scaling Exponent Estimation from Stride Interval Time Series and Steps-ahead Prediction
PI: Ervin Sejdic, PhD; Co-I's: Jennifer Brach, PhD; Subashan Perera, PhD

Significance: With increasing use of technologies such as accelerometers, we are able to obtain stride interval time series that are sufficiently long to apply sophisticated time series analytic methods to identify the structure of longitudinal dependence among strides, and use the said structure to potentially predict the next stride with a certain degree of accuracy. The dominant approach for uncovering complex inter-dependencies among stride intervals is long-range (fractal) modeling and scaling exponent α estimation, where α describes the structure of dependence. But controversies remain about the method of estimation of α. Commonly used de-trended fluctuation analysis estimation method depends on the choice of initiation parameters, has many other drawbacks such as irrelevance, false positives, equivalent results from short-range models, nonlinear trend artifacts, estimator bias, lack of robustness, and difficulties with short walks. In contrast, we have previously shown wavelet-based estimation methods are more accurate for scaling exponent analysis. Aims-(1) Systematically evaluate, via simulation, several methods for predicting the next stride; (2) understand how many strides ahead we can accurately predict; and (3) apply the methods to subpopulations with gait abnormalities.
Approach: First, we will simulate 1,000 series of 10,000 stride intervals each from walks with a known $\alpha=0.5-1.5$ associated with gait. Second, we will use wavelet methods for prediction of several future strides.
Third, predictive accuracy will be quantified using mean square error (MSE) of predicted stride intervals against the "observed truth" in simulated data. Fourth, we will repeat simulations with shorter series of length=150-200 strides to mimic a typical 6-minute walk. Fifth, the method with the smallest MSE is clearly preferable, and we will provide a computational evidence-based recommendation of a prediction method either uniformly better in all situations, better in certain situations involving short/long series and/or for specific subpopulations with gait abnormalities such as Parkinson's disease (PD) based on their α. Finally, using the recommended methods from simulation above, we will predict last few stride intervals from our previous OAIC pilot study and Physionet (de-identified data) including PD (N=118), peripheral neuropathy (N=10), Huntington's disease (N=20), amyotrophic lateral sclerosis (N=13) and healthy controls (N=99); and compare to observed values. We will use MATLAB® software (The MathWorks, Inc., Natlick, Massachusetts) for simulation and α estimation, and SAS® (SAS Institute, Inc., Cary, North Carolina) for summarization of results. Upon completion, we will provide evidence-based recommendations of prediction methods to be used with stride interval time series to predict future strides.

C.   Current Year Pilots

PES 1: Assessing muscle energetics non-invasively in the oldest old
Project Leader: Hoby Hetherington, PhD (Prof Radiology); Co-Is: Anne Newman, MD, MPH (Prof Med and Epi, co-leader LAC core); Adam Santanasto, PhD (Epi of Aging Fellow and proposed RCDC novice).

Significance: Loss of ability to regenerate adenosine triphosphate (ATP) in skeletal muscle mitochondria may be of major importance in explaining the loss of muscle performance and mobility with age. In well-functioning older adults, ATP regeneration (ATPmax), measured with 31P magnetic resonance spectroscopy (MRS), was strongly associated with in vitro measures of mitochondrial function, citrate synthase activity, maximal mitochondrial (state 3) respiration and maximal whole-body aerobic capacity (VO2 peak). Further validation of our 31P MRS protocol, during which participants perform repeated leg contractions, as an integrated measure of in vivo mitochondrial function could circumvent the need for muscle biopsy. This noninvasive measure would allow us to examine the importance of mitochondrial function in larger populations. Finally, if valid and related to 400 meter walk performance, it would support the hypothesis that mitochondrial function is an important predictor of mobility and a potential target for intervention in larger studies. Hypothesis**:** Mitochondrial ATP regeneration (ATPmax) will 1) be strongly associated with oxidative capacity of muscle assessed in biopsy specimens using high resolution respirometry 2) as well as with 400 meter walk performance.

Approach: Muscle biopsy was recently collected for in vitro assessment of mitochondrial function in the Health ABC study (n=40 aged 88.4 ± 2.3 years, 62.5% women and 35% black). We will add 31P MRS to assess maximal recovery of ATP (ATP Max) and a 400 meter walk to measure walking performance. We will also measure oxygen consumption during the walk and calculate the energy cost of walking. We will repeat the 31P MRS protocol in 8 participants to determine reproducibility. Analysis of the spectral waveforms will be conducted by Dr. Santanasto with support from the MR Research Center.

PES 2: CNS dosage measures with falls/fractures in older high risk nursing home residents
Project Leader: Carolyn Thorpe, PhD (Asst Prof, Pharm, RCDC novice); Co-Is Joseph T. Hanlon, PharmD, MS (Prof, Med, Pharm, and Epi, PESC leader); Subashan Perera, PhD (Assoc Prof, Med, DMAIC co-leader; David Nace MD, MPH (Asst Prof, Med, CPOC LTC director; Susan Greenspan, MD (Prof Med, OAIC PI)

Significance: Both falls and use of CNS medications are common in older nursing home patients. There is no consensus on how best to measure aggregate CNS medication dosage burden as it relates to fall/fracture risk. This is a clinically relevant gap because providers need to reduce overall CNS medication dosage to reduce injurious falls/fractures, yet there is little guidance on how best to measure such exposure. Hypothesis: CNS summated standardized dosage measure (SDD) has greater predictive validity than sedative drug burden index (DBI).

Approach: This national longitudinal study will use Medicare Parts A, B, and D data merged with Minimum Data Set (Mor et al, 2004) for nearly 200,000 older (65+) beneficiaries admitted to nursing homes (NH) in 2009/10. We will include long-stay residents with a history of injurious falls/non-vertebral fractures excluding non-ambulatory, bedridden, comatose or those with fractures due to cancer/trauma. The main outcome measure will be incident injurious falls/fractures as documented by emergency room/hospitalization ICD-9 codes. Using Medicare Part D data, we will create a time-varying CNS SDD measure for antidepressants, antipsychotics, benzodiazepine receptor agonists, anticonvulsants, opioids and skeletal muscle relaxants by dividing total daily dose by the minimum effective geriatric daily dose aggregating across medications.[5] Sedative DBI measure will be created similarly but will differ by the drugs included and the logarithmic daily dosage calculation. We will control for important demographic and health status factors (including common indications) that could potentially confound an association between CNS medication use and injurious falls/fractures. We will use multivariable logistic regression modeling, odds ratios and area under ROC curve (c-statistic) to quantify predictive validity.

PES 3: Neuroimaging Motor Skill, Learning and Adaption for Walking
Project Leaders: Jessie VanSwearingen, PhD, PT, FAPTA (Assoc Prof, Physical Therapy); Co-Investigator Andrea Rosso, PhD (Asst Prof, Epi);

Significance: The proposed work will form the scientific basis necessary to: 1) evaluate neuroplastic effects of motor learning interventions for walking; 2) derive and test further novel approaches to achieve both walking efficiency and neural efficiency; and 3) incorporate motor learning exercise into standard interventions to prevent or treat age-related walking problems. Our findings could establish a link between age-related changes in gait and greater brain activity in a broad network of cortico-cortico regions; the loss of neural efficiency for walking. The link to central neural functional mechanisms would be a substantial departure from the more commonly held explanations for gait dysfunction of aging – muscle weakness, joint biomechanical limitations, cardiorespiratory deconditioning and skeletal muscle mitochondrial damage. The proposed work is also important to advance knowledge of motor learning and neural correlates of motor skill in older adults. The ability of older adults to learn new motor skills is known, but little has been described about the functional neural circuitry correlates of compensated walking performance in older adults with age-related loss of motor skill in walking.

Approach: We will recruit older adults (n=10) enrolled in the motor learning based exercise (Standard-Plus, Task Specific Timing and Coordination Intervention) arm of our partnering NIA funded clinical trial (R01 AG045252) to participate. Older adults in the RCT parent study are ≥ 65 years old, and walk slower than the usual (range, 0.60m/s to 1.2m/s), representative of a range of age-related loss of motor skill in walking. The target population is older adults with age-related loss of motor skill in walking, excluding stroke or progressive neurological diseases. The critical exclusion criteria: 1) non-neurological related (e.g., arthritis, cardiovascular disease, cardiopulmonary obstructive disease, peripheral vascular disease) slowing of gait, and 2) health problems that prohibit safe participation in walking tasks and neuroimaging. B.2.1 Timeline (Table).We will

enroll approximately 3 subjects a month for ~3.5 months, total 10 subjects. All subjects will be enrolled and all testing completed by month 6.

PES 4: Reversal of Chondrocyte Aging by 3D Cytoskeletal Re-organization
Project Leaders: Rocky S. Tuan, PhD (Prof, Ortho), Hang Lin, PhD (Research Instructor, Ortho)

Significance: To our knowledge, there have been no studies on the effect of cytoskeletal disruption on aging chondrocytes. We therefore hypothesize here that a 3D re-organization of the cytoskeleton will rejuvenate aging chondrocytes back to a stable phenotypic state comparable to that of young chondrocytes . To test our hypothesis, in Aim 1 we will first analyze how cytoskeletal organization relates to the phenotypic state of chondrocytes and test the effect of different cytoskeleton-disrupting agents and treatment regimens on proliferation capacity and phenotype of aging chondrocytes. The goal is to identify the best cytoskeletondisrupting agent(s) and conditions in reversing the senescent state, which will be used to rejuvenate aging chondrocytes in following studies. In Aim 2, rejuvenated chondrocytes generated from optimized treatment will be culture expanded, loaded within a chondrosupportive hydrogel scaffold developed in our lab and transplanted subcutaneously into mice to assess their cartilage formation capacity. Untreated aged chondrocytes and cells isolated from young cartilage will serve as negative and positive controls, respectively.

Approach: As presented above, cytoskeletal organization is closely related to the cellular age of chondrocytes. We hypothesize that elongated and stressed microfilaments and dense microtubules accompany the aging progress, and that disrupting these cytoskeletal structures is able to halt or reverse chondrocyte aging state. We will first investigate the direct relationship between cytoskeletal structure alteration and cellular aging, i.e., relative gene expression of collagen type II/I, aggrecan/versican. Senescence-associated (SA) β-galactosidase (SAG), a marker of cell senescence, will also be analyzed. With IRB approval (University of Washington/University of Pittsburgh), we have regular access to surgical wastes, including knee joints, from patients that have undergone total joint arthroplasty. Articular cartilage will be harvested from macroscopically asymptomatic areas of the knee articular surface, and human chondrocytes isolated by collagenase II digestion. The state and organization of microfilaments, microtubules and intermediate filaments will be visualized by epifluoresence microscopy using fluoroprobe-tagged phalloidin, and anti-tubulin and anti-vimentin antibodies, respectively, using standard protocols in our lab. Chondrocytes will be treated with different agents for 1 or 3 days, including microfilament-disrupting and microtubule-disrupting agents, at concentrations similar to published dosages: (1) microfilament disrupting agents - Cytochalasin D, 1 μM; latrunculin B, 1 μM; dihydrocytochalasin B, 3 μM; staurosporine, 1 μM; (2) microtubule disrupting agents – nocodazole, 10 μM; Myoseverin: 25 μM. After 3 days of additional culture, single cells will be harvested by using a collagenase II-containing enzyme mixture reported before, and cytoskeletal structure, proliferation capacity and gene expression will be assessed as described above. Based on these results, best-performing agents/conditions for microfilament and microtubule disruption will be identified.

PES 5:   Exercise improves aging tendons by inducing cellular and molecular changes
Project Leaders: James H-C. Wang, PhD (Prof, Ortho); MaCalus Hogan, MD (Asst Prof, Ortho)

Significance: With an increase in the aging population, aging-related musculoskeletal tissue problems have become a huge healthcare concern. In particular, aging decreases the mechanical properties of tendons and as a result, predisposes tendons to injury. Aging also impairs tendon healing, and is a major risk factor for tendinopathy or degenerative changes in tendons. Thus, aging impairs the quality of life among millions of aging population in the United States. Treatment of such injuries cost billions of health care dollars every year.
This study is highly innovative because: a) This is the first study to test a novel hypothesis that moderate exercise improves the biological and biomechanical properties of aging tendons by rejuvenating TSCs and thus improves tendon matrix structure and function; and b) this is also the first comprehensive study to determine how moderate exercise regulates tendon cell senescence and therefore moderate exercise may be used to treat degenerative changes in the tendons of aging patients in clinical settings.

Approach: The experimental design for this aim consists of an MTR group and a control group, each with 54 male aging mice (20 months). Mice in the MTR group will be subject to a regimen of treadmill running 13 m/min, 50 min/day, 5 days/week/. After treadmill running, mice will be scarified, and patellar and Achilles tendons will be harvested for the following analyses. **1**) Detecting senescent cells by staining for SA-β-gal on tendon sections (6 mice). **2**) Using Western blot analysis to measure CCN-1, p53 and p16 expression (12 mice); **3**) applying qRT-PCR, ELISA, and Western blot to detect the senescence-associated secretary phenotype (SASP) including the expression of collagen I and III; MMP-1, MMP-3, MMP-13, IL-6 and IL-8 (20 mice); and 4) by immuno-staining CD31, a marker for angiogenesis (4 mice), to reveal the role of angiogenesis in the remodeling of degenerative aging mouse tendons due to MTR. Functional evaluation of aging tendons before and after MTR − Mechanical testing will be performed to evaluate the impact of MTR on tendon function. A total of 12 mice in each group will be used for the testing. Both the structural and mechanical properties of the mouse patellar tendon (e.g. stiffness and ultimate tensile strength) will be determined.

Section III. Career Development

Novice Program: The novice program is for investigators who have an interest in balance, mobility and aging research. Candidates must have a sponsoring mentor involved in the OAIC. These trainees have been funded through T32s, predoctoral awards, and other early career development awards.

Transition to Independence: The purpose of this program is to promote development into an independent investigator by fostering experiences in leadership and collaboration with investigators and supplementing skills as desired. These young investigators already have independent career awards in areas relevant to age-related balance and mobility.

REC Scholars 2015-2016:

Shachi Tyagi, MD, became a novice RCDC member in 2013-14. In this capacity she was able to utilize OAIC resources to initiate a secondary analysis of a study that had assessed adherence to physical activity in sedentary post-menopausal females. Her findings were surprising: even in this cohort of healthy, younger women (aged 50-65 years), sleep correlated significantly not only with objective balance measures but also with subjective balance and confidence. Further pursuit of this relationship between sleep and balance provides the rationale for her project as a Pepper Scholar in our current Pepper grant. She became a Pepper Scholar in August 2014 to look at the association between insomnia, falls and mobility with Dr. Buysse as her primary mentor. In this way, Dr. Tyagi continued as a K scholar for an additional year (2015-2016) to further develop a career in translational research.

Laurie H. Sanders, PhD, has been a novice member of the RCDC (2013-2014) and was involved in a Pepper pilot project to examine mtDNA damage in muscle cells in older patients following exercise (PI Greenamyre, Goodpaster). She began as a RCDC scholar in summer 2014 and is determining whether brain regions associated with mobility and balance selectively accumulate mtDNA damage (as a surrogate – and possible cause of – mitochondrial dysfunction) in a progeria mouse model. In an effort to become more involved in translational research, her recent work involves investigating the utility of mtDNA damage as a biomarker of PD using human blood samples. Her preliminary findings were unanticipated; increased mtDNA damage was found in blood from sporadic PD patients. This relationship between mtDNA damage (and mitochondrial dysfunction) and PD status became the basis of her KL2 proposal in 2015. Specifically, with Dr. Kirk Erickson, she is examining whether exercise, which has been shown to improve mitochondrial mass and function in elderly subjects as well as to improve PD motor function, has measurable beneficial effects on the mtDNA damage found in PD patients. In this way, Dr. Sanders will continue as a scholar for an additional year (2016-2017) to further develop a career in translational research.

RCDC Scholars at University of Pittsburgh OAIC 2004-present

Name	Dates	Dept	Grants	Current Position
Jennifer Brach, PT, PhD	2004-05	PT	Beeson K23, Co-I R01, NSF, PCORI, R01	Assoc Prof PT, Pepper Core Director
Caterina Rosano, MD, MPH	2004-05	Epi	Beeson K23, R03, 3 R01's, Co-I 2 R01's, U13	Assoc Prof Epi, Pepper Core Director
Susan Hardy, MD, PhD	2005-06	Geri	Beeson K23, R03, U01, AGS Aging Foundation	Assoc Med Dir PACE, Mass.
Rollin Wright, MD, MS	2005-06	Geri	Hartford Scholar, GACA, Co-I GWFEP HRSA	Asst Prof Med

Laurie Lavery, MD	2006	Geri	K23 unfunded	Hospitalist Pvt Pctc
Stasa Tadic, MD	2007	Geri	Hartford Scholar, K23	Asst Prof Med
Kimberly Faulkner, PhD	2007-08	Epi	NIOSH grants	NIOSH Proj Officer
Theodore Huppert, PhD	2007-09	Rad Bioeng	R01, R21, DARPA Co-I, SBIR Co-I	Asst Prof
Kirk Erickson, PhD	2009-10	Psych	R01, Co-I R01, Co-I DOD, UPMC Res Foundation	Assoc Prof
Elizabeth Hile, PT, PhD	2010-11	PT	Komen Foundation, PCORI Co-PI	Asst Prof , OUHSC
Neelesh Nadkarni, MD, PhD	2010-12	Geri	Hartford Scholar, K23	Asst Prof
Ervin Sejdic, PhD	2011	Bioeng Elec Eng	R01	Asst Prof
Zachary Marcum, PharmD	2011-14	Geri Pharm	Co-I R01, Magee Foundation, Beckwith Foundation	Asst Prof, Univ of WA
Gelsy Torres-Ovieda, PhD	2013	Bioeng	U of Pgh Career Dev, NSF BRIDGE, American Heart Assoc SDG , NSF Grant	Asst Prof
Linwah Yip, MD	2013-14	Surgery	Hartford Scholar, R03	Asst Prof
Bethany Barone-Gibbs, PhD	2014	Health	American Heart Association	Asst Prof
Shachi Tyagi, MD	2014-17	Geriatrics	Hartford Scholar	Asst Prof
Laurie Sanders, PhD	2014-17	Neurology	CTSI Grant	Asst Prof

Section IV. Publications

2015
1: Carley JA, Karp JF, Gentili A, Marcum ZA, Reid MC, Rodriguez E, Rossi MI, Shega J, Thielke S, Weiner DK. Deconstructing Chronic Low Back Pain in the Older Adult: Step by Step Evidence and Expert-Based Recommendations for Evaluation and Treatment: Part IV: Depression. Pain Med. 2015 Nov;16(11):2098-108. doi: 10.1111/pme.12935. Epub 2015 Nov 5. PubMed PMID: 26539754; PubMed Central PMCID: PMC4821461.

2: Siglinsky E, Krueger D, Ward RE, Caserotti P, Strotmeyer ES, Harris TB, Binkley N, Buehring B. Effect of age and sex on jumping mechanography and other measures of muscle mass and function. J Musculoskelet Neuronal Interact. 2015 Dec;15(4):301-8. PubMed PMID: 26636275; PubMed Central PMCID: PMC4784267.

 3: Lange-Maia BS, Newman AB, Strotmeyer ES, Harris TB, Caserotti P, Glynn NW. Performance on fast- and usual-paced 400-m walk tests in older adults: are they comparable? Aging Clin Exp Res. 2015 Jun;27(3):309-14. doi: 10.1007/s40520-014-0287-y. Epub 2014 Nov 6. PubMed PMID: 25373610; PubMed Central PMCID: PMC4422783.

4: Hanlon JT, Aspinall SL, Handler SM, Gellad WF, Stone RA, Semla TP, Pugh MJ, Dysken MW. Potentially suboptimal prescribing for older veteran nursing home patients with dementia. Ann Pharmacother. 2015 Jan;49(1):20-8. doi: 10.1177/1060028014558484. Epub 2014 Nov 7. PubMed PMID: 25380592; PubMed Central PMCID: PMC4272650.

5: Cesari M, Vellas B, Hsu FC, Newman AB, Doss H, King AC, Manini TM, Church T, Gill TM, Miller ME, Pahor M; LIFE Study Group. A physical activity intervention to treat the frailty syndrome in older persons-results from the LIFE-P study. J Gerontol A Biol Sci Med Sci. 2015 Feb;70(2):216-22. doi: 10.1093/gerona/glu099. Epub 2014 Nov 11. PubMed PMID: 25387728; PubMed Central PMCID: PMC4311184.

6: Bone HG, Dempster DW, Eisman JA, Greenspan SL, McClung MR, Nakamura T, Papapoulos S, Shih WJ, Rybak-Feiglin A, Santora AC, Verbruggen N, Leung AT, Lombardi A. Odanacatib for the treatment of postmenopausal osteoporosis: development history and design and participant characteristics of LOFT, the Long-Term Odanacatib Fracture Trial. Osteoporos Int. 2015 Feb;26(2):699-712. doi: 10.1007/s00198-014-2944-6. Epub 2014 Nov 29. Erratum in: Osteoporos Int. 2015 Nov;26(11):2721. PubMed PMID: 25432773; PubMed Central PMCID: PMC4312384.

7: Brach JS, Lowry K, Perera S, Hornyak V, Wert D, Studenski SA, VanSwearingen JM. Improving motor control in walking: a randomized clinical trial in older adults with subclinical walking difficulty. Arch Phys Med Rehabil. 2015 Mar;96(3):388-94. doi: 10.1016/j.apmr.2014.10.018. Epub 2014 Nov 10. PubMed PMID: 25448244; PubMed Central PMCID: PMC4850731.

8: Almeida GJ, Wert DM, Brower KS, Piva SR. Validity of physical activity measures in individuals after total knee arthroplasty. Arch Phys Med Rehabil. 2015 Mar;96(3):524-31. doi: 10.1016/j.apmr.2014.10.009. Epub 2014 Oct 31. PubMed PMID: 25450127; PubMed Central PMCID: PMC4339513.

9: Sustakoski A, Perera S, VanSwearingen JM, Studenski SA, Brach JS. The impact of testing protocol on recorded gait speed. Gait Posture. 2015 Jan;41(1):329-31. doi: 10.1016/j.gaitpost.2014.10.020. Epub 2014 Oct 28. PubMed PMID: 25468684; PubMed Central PMCID: PMC4271538.

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11: Albert SM, King J, Keene RM. Assessment of an interactive voice response system for identifying falls in a statewide sample of older adults. Prev Med. 2015 Feb;71:31-6. doi: 10.1016/j.ypmed.2014.12.006. Epub 2014 Dec 13. PubMed PMID: 25514548; PubMed Central PMCID: PMC4329041.

12: Marcum ZA, Driessen J, Thorpe CT, Donohue JM, Gellad WF. Regional variation in use of a new class of antidiabetic medication among medicare beneficiaries: the case of incretin mimetics. Ann Pharmacother. 2015 Mar;49(3):285-92. doi: 10.1177/1060028014563951. Epub 2014 Dec 16. PubMed PMID: 25515869; PubMed Central PMCID: PMC4876962.

13: Nace DA, Lin CJ, Ross TM, Saracco S, Churilla RM, Zimmerman RK. Randomized, controlled trial of high-dose influenza vaccine among frail residents of long-term care facilities. J Infect Dis. 2015 Jun 15;211(12):1915-24. doi: 10.1093/infdis/jiu622. Epub 2014 Dec 17. PubMed PMID: 25525051; PubMed Central PMCID: PMC4539906.

14: Stahl ST, Albert SM. Gender differences in physical activity patterns among older adults who fall. Prev Med. 2015 Feb;71:94-100. doi: 10.1016/j.ypmed.2014.12.016. Epub 2014 Dec 20. PubMed PMID: 25535677; PubMed Central PMCID: PMC4844019.

15: Aspinall SL, Zhao X, Semla TP, Cunningham FE, Paquin AM, Pugh MJ, Schmader KE, Stone RA, Hanlon JT; Veterans Affairs Community Living Center Pharmacotherapy Research Group. Epidemiology of drug-disease interactions in older veteran nursing home residents. J Am Geriatr Soc. 2015 Jan;63(1):77-84. doi: 10.1111/jgs.13197. Epub 2014 Dec 23. PubMed PMID: 25537124; PubMed Central PMCID: PMC4300245.

16: Lo-Ciganic WH, Perera S, Gray SL, Boudreau RM, Zgibor JC, Strotmeyer ES, Donohue JM, Bunker CH, Newman AB, Simonsick EM, Bauer DC, Satterfield S, Caserotti P, Harris T, Shorr RI, Hanlon JT; Health, Aging and Body Composition Study. Statin use and decline in gait speed in community-dwelling older adults. J Am Geriatr Soc. 2015 Jan;63(1):124-9. doi: 10.1111/jgs.13134. Epub 2014 Dec 23. PubMed PMID: 25537649; PubMed Central PMCID: PMC4300263.

17: Nadkarni NK, Perera S, Hanlon JT, Lopez O, Newman AB, Aizenstein H, Elam M, Harris TB, Kritchevsky S, Yaffe K, Rosano C. Statins and brain integrity in older adults: secondary analysis of the Health ABC study. Alzheimers Dement. 2015 Oct;11(10):1202-11. doi: 10.1016/j.jalz.2014.11.003. Epub 2015 Jan 12. PubMed PMID: 25592659; PubMed Central PMCID: PMC4499493.

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19: Gray SL, Anderson ML, Dublin S, Hanlon JT, Hubbard R, Walker R, Yu O, Crane PK, Larson EB. Cumulative use of strong anticholinergics and incident dementia: a prospective cohort study. JAMA Intern Med. 2015 Mar;175(3):401-7. doi:

10.1001/jamainternmed.2014.7663. PubMed PMID: 25621434; PubMed Central PMCID: PMC4358759.

20: Nayak S, Edwards DL, Saleh AA, Greenspan SL. Systematic review and meta-analysis of the performance of clinical risk assessment instruments for screening for osteoporosis or low bone density. Osteoporos Int. 2015 May;26(5):1543-54. doi: 10.1007/s00198-015-3025-1. Epub 2015 Feb 3. Review. PubMed PMID: 25644147; PubMed Central PMCID: PMC4401628.

21: Bann D, Hire D, Manini T, Cooper R, Botoseneanu A, McDermott MM, Pahor M, Glynn NW, Fielding R, King AC, Church T, Ambrosius WT, Gill TM; LIFE Study Group. Light Intensity physical activity and sedentary behavior in relation to body mass index and grip strength in older adults: cross-sectional findings from the Lifestyle Interventions and Independence for Elders (LIFE) study. PLoS One. 2015 Feb 3;10(2):e0116058. doi: 10.1371/journal.pone.0116058. eCollection 2015. Erratum in: PLoS One. 2015;10(4):e0126063. Gill, Thomas [corrected to Gill, Thomas M]. PubMed PMID: 25647685; PubMed Central PMCID: PMC4315494.

22: Strollo SE, Caserotti P, Ward RE, Glynn NW, Goodpaster BH, Strotmeyer ES. A review of the relationship between leg power and selected chronic disease in older adults. J Nutr Health Aging. 2015 Feb;19(2):240-8. doi: 10.1007/s12603-014-0528-y. Review. PubMed PMID: 25651453; PubMed Central PMCID: PMC4840887.

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physical activity with cardiovascular risk in mobility-limited older adults. J Am Heart Assoc. 2015 Feb 18;4(2). pii: e001288. doi: 10.1161/JAHA.114.001288. PubMed PMID: 25696062; PubMed Central PMCID: PMC4345863.

27: Campbell GB, Skidmore ER, Whyte EM, Matthews JT. Overcoming practical challenges to conducting clinical research in the inpatient stroke rehabilitation setting. Top Stroke Rehabil. 2015 Oct;22(5):386-95. doi: 10.1179/1074935714Z.0000000045. Epub 2015 Mar 17. PubMed PMID: 25775955; PubMed Central PMCID: PMC4573785.

28: Tang W, Cushman M, Green D, Rich SS, Lange LA, Yang Q, Tracy RP, Tofler GH, Basu S, Wilson JG, Keating BJ, Weng LC, Taylor HA, Jacobs DR Jr, Delaney JA, Palmer CD, Young T, Pankow JS, O'Donnell CJ, Smith NL, Reiner AP, Folsom AR. Gene-centric approach identifies new and known loci for FVIII activity and VWF antigen levels in European Americans and African Americans. Am J Hematol. 2015 Jun;90(6):534-40. doi: 10.1002/ajh.24005. Epub 2015 Apr 1. PubMed PMID: 25779970; PubMed Central PMCID: PMC4747096.

29: Li Z, Wei Z, Yue Y, Wang H, Jia W, Burke LE, Baranowski T, Sun M. An adaptive Hidden Markov model for activity recognition based on a wearable multi-sensor device. J Med Syst. 2015 May;39(5):57. doi: 10.1007/s10916-015-0239-x. Epub 2015 Mar 19. PubMed PMID: 25787786.

30: Fatemi G, Fang MA, Breuer P, Cherniak PE, Gentili A, Hanlon JT, Karp JF, Morone NE, Rodriguez E, Rossi MI, Schmader K, Weiner DK. Deconstructing chronic low back pain in the older adult--Step by step evidence and expert-based recommendations for evaluation and treatment part III: Fibromyalgia syndrome. Pain Med. 2015 Sep;16(9):1709-19. doi: 10.1111/pme.12863. Epub 2015 Aug 14. Review. PubMed PMID: 26272644.

31: Marcum ZA, Perera S, Newman AB, Thorpe JM, Switzer GE, Gray SL, Simonsick EM, Shorr RI, Bauer DC, Castle NG, Studenski SA, Hanlon JT; Health ABC Study. Antihypertensive Use and Recurrent Falls in Community-Dwelling Older Adults: Findings From the Health ABC Study. J Gerontol A Biol Sci Med Sci. 2015 Dec;70(12):1562-8. doi: 10.1093/gerona/glv095. Epub 2015 Aug 11. PubMed PMID: 26265732; PubMed Central PMCID: PMC4643613.

32: Flores RR, Kim E, Zhou L, Yang C, Zhao J, Gambotto A, Robbins PD. IL-Y, a synthetic member of the IL-12 cytokine family, suppresses the development of type 1 diabetes in NOD mice. Eur J Immunol. 2015 Nov;45(11):3114-25. doi: 10.1002/eji.201445403. Epub 2015 Sep 1. PubMed PMID: 26260044; PubMed Central PMCID: PMC4823813.

33: Marcum ZA, Perera S, Thorpe JM, Switzer GE, Gray SL, Castle NG, Strotmeyer ES, Simonsick EM, Bauer DC, Shorr RI, Studenski SA, Hanlon JT; Health ABC Study, USA. Anticholinergic Use and Recurrent Falls in Community-Dwelling Older Adults: Findings From the Health ABC Study. Ann Pharmacother. 2015 Nov;49(11):1214-21. doi: 10.1177/1060028015596998. Epub 2015 Jul 30. PubMed PMID: 26228936; PubMed

Central PMCID: PMC4609603.

34: Barone Gibbs B, Pettee Gabriel K, Reis JP, Jakicic JM, Carnethon MR, Sternfeld B. Cross-sectional and longitudinal associations between objectively measured sedentary time and metabolic disease: the Coronary Artery Risk Development in Young Adults (CARDIA) study. Diabetes Care. 2015 Oct;38(10):1835-43. doi: 10.2337/dc15-0226. Epub 2015 Jul 8. PubMed PMID: 26156528; PubMed Central PMCID: PMC4580607.

35: Lo-Ciganic WH, Donohue JM, Thorpe JM, Perera S, Thorpe CT, Marcum ZA, Gellad WF. Using machine learning to examine medication adherence thresholds and risk of hospitalization. Med Care. 2015 Aug;53(8):720-8. doi: 10.1097/MLR.0000000000000394. PubMed PMID: 26147866; PubMed Central PMCID: PMC4503478.

36: Marcum ZA, Hardy SE. Medication Management Skills in Older Skilled Nursing Facility Residents Transitioning Home. J Am Geriatr Soc. 2015 Jun;63(6):1266-8. doi: 10.1111/jgs.13469. PubMed PMID: 26096411; PubMed Central PMCID: PMC4814224.

37: Rajakumar K, Moore CG, Yabes J, Olabopo F, Haralam MA, Comer D, Bogusz J, Nucci A, Sereika S, Dunbar-Jacob J, Holick MF, Greenspan SL. Effect of Vitamin D3 Supplementation in Black and in White Children: A Randomized, Placebo-Controlled Trial. J Clin Endocrinol Metab. 2015 Aug;100(8):3183-92. doi: 10.1210/jc.2015-1643. Epub 2015 Jun 19. PubMed PMID: 26091202; PubMed Central PMCID: PMC4524986.

38: Forman DE, Sanderson BK, Josephson RA, Raikhelkar J, Bittner V; American College of Cardiology's Prevention of Cardiovascular Disease Section. Heart Failure as a Newly Approved Diagnosis for Cardiac Rehabilitation: Challenges and Opportunities. J Am Coll Cardiol. 2015 Jun 23;65(24):2652-9. doi: 10.1016/j.jacc.2015.04.052. Review. PubMed PMID: 26088305.

39: Farrokhi S, Meholic B, Chuang WN, Gustafson JA, Fitzgerald GK, Tashman S. Altered frontal and transverse plane tibiofemoral kinematics and patellofemoral malalignments during downhill gait in patients with mixed knee osteoarthritis. J Biomech. 2015 Jul 16;48(10):1707-12. doi: 10.1016/j.jbiomech.2015.05.015. Epub 2015 May 29. PubMed PMID: 26087880; PubMed Central PMCID: PMC4521908.

40: Wert DM, VanSwearingen J, Perera S, Studenski S, Brach JS. The Impact of a Portable Metabolic Measurement Device on Gait Characteristics of Older Adults With Mobility Limitations. J Geriatr Phys Ther. 2016 Apr-Jun;39(2):77-82. doi: 10.1519/JPT.0000000000000053. PubMed PMID: 25973568; PubMed Central PMCID: PMC4644104.

41: Millecamps A, Lowry KA, Brach JS, Perera S, Redfern MS, Sejdić E. Understanding the effects of pre-processing on extracted signal features from gait accelerometry signals. Comput Biol Med. 2015 Jul;62:164-74. doi:

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anticholinergic use among community-dwelling elders. Consult Pharm. 2015
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of single-dose zoledronic acid for osteoporosis in frail elderly women: a
randomized clinical trial. JAMA Intern Med. 2015 Jun;175(6):913-21. doi:
10.1001/jamainternmed.2015.0747. PubMed PMID: 25867538; PubMed Central PMCID:
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instability. J Orthop Sports Phys Ther. 2015 May;45(5):351-9. doi:
10.2519/jospt.2015.5540. Epub 2015 Mar 26. PubMed PMID: 25808531.

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instability. Clin Biomech (Bristol, Avon). 2015 Jun;30(5):475-80. doi:
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49: Greenspan SL, Vujevich KT, Brufsky A, Lembersky BC, van Londen GJ, Jankowitz
RC, Puhalla SL, Rastogi P, Perera S. Prevention of bone loss with risedronate in
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2015 Jun;26(6):1857-64. doi: 10.1007/s00198-015-3100-7. Epub 2015 Mar 20. PubMed
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2016

1: O'Connell M, Farrokhi S, Fitzgerald GK. The role of knee joint moments and knee impairments on self-reported knee pain during gait in patients with knee osteoarthritis. Clin Biomech (Bristol, Avon). 2016 Jan;31:40-6. doi: 10.1016/j.clinbiomech.2015.10.003. Epub 2015 Oct 9. PubMed PMID: 26527453.

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3: Brach JS, Francois SJ, VanSwearingen JM, Gilmore S, Perera S, Studenski SA. Translation of a Motor Learning Walking Rehabilitation Program Into a Group-Based Exercise Program for Community-Dwelling Older Adults. PM R. 2016 Jun;8(6):520-8. doi: 10.1016/j.pmrj.2015.10.004. Epub 2015 Oct 19. PubMed PMID: 26493856; PubMed Central PMCID: PMC4837083.

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10: Gatouillat A, Bleton H, VanSwearingen J, Perera S, Thompson S, Smith T, Sejdić E. Cognitive tasks during walking affect cerebral blood flow signal features in middle cerebral arteries and their correlation to gait characteristics. Behav Brain Funct. 2015 Sep 26;11(1):29. doi: 10.1186/s12993-015-0073-9. PubMed PMID: 26409878; PubMed Central PMCID: PMC4583750.

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Section V. External Advisory Board Members 2015-2016

Nicolaas Bohnen, MD, PhD, Professor Radiology, Professor Neurology, University of Michigan – 6 Years

Pamela Duncan, PT, PHD, Professor Neurology, Wake Forest University – 11 Years

Luigi Ferrucci, MD, PhD, Scientific Director, NIA/NIH – 11 Years

Joe Verghese, MD, Professor of Medicine, Division of Geriatrics, Albert Einstein College of Medicine – 9 Years (ended 6/2016)

George A Kuchel, MD, CM, FRCP, AGSF, Professor Geriatrics and Gerontology, University of Connecticut- (Newly Appointed)

University of Pittsburgh
Awards and Recognition 2015-2016

Barone-Gibbs, Bethany
- 'Outstanding Junior Scientist' award from the University of Pittsburgh's Aging Institute at the 2015 conference
- Aging Institute Junior Faculty Award (2015)
- American Heart Association Fellowship (March 2016)

Bon, Jessica
- Young Investigator Award: 6/15
- Division of Pulmonary, Allergy & CCM, U. of Pitt.
- Junior Translational Scholar Award: 8/15
- Division of Pulmonary, Allergy & CCM, U. of Pitt.

Forman, Daniel
- Best Doctors in American Award

Glynn, Nancy
- Alumni Service Award, May 2015
- Distinguished Alumni Award – May 2015
- Margaret F. Gloninger Service Award

Greenamyre, J Timothy
- Listed, Best Doctors in America, 2015
- Elected, Association of American Physicians, 2015
- Vice Chair, Gordon Research Conference on Parkinson's Disease, 2015-17
- Mentor, New Chair Orientation, Center for Scientific Review (CSR), NIH, 2015

Greenspan, Susan
- Vice President, National Osteoporosis Foundation, 2016
- Co-Chair Interdisciplinary Symposium on Osteoporosis, 2016
- Best Doctors in American Award, 2016
- Best Doctors in Pittsburgh Award, 2016
- Member, Clinical Trials Advisory Panel, NIA, 2016

Hanlon, Joseph
- William B. Abrams Award in Geriatric Clinical Pharmacology, American Society of Clinical Pharmacology and Therapeutics, 2016
- Faculty Honoree Convocation Award, UPITT, 2016
- Sustained Contributions to Research Literature Award, American Society of Health-Systems Pharmacists, 2015

Jain, Samay
- Michael J. Fox Foundation for Parkinson Research (PI) - Rapid Response Innovation Award

- American Parkinson Disease Association, Inc (Consultant) : Mortality in PD: The PEACE Consortium
- UPMC Mitochondria, Aging and Metabolism Pilot Project Program (co-investigator): Assessment of peripheral mtDNA damage and dysfunction as a biomarker of Parkinson's disease
- Best Abstract, Parkinson Study Group Annual Meeting 2015

Naples, Jennifer
- Best Paper - Epidemiology Paper Session, American Geriatrics Society Annual Meeting 2015, Washington, DC

Newman, Anne
- Understanding human aging: an epidemiologic perspective. Provost's Inaugural Lecture Katherine Detre Endowed Chair of Population Health Sciences; University of Pittsburgh, Pittsburgh, PA, USA. March 19, 2015
- Member, Council, NIA, 2016

Park, Mijung
- AAPINA- Okura Mental Health Leadership Foundation Fellow
- Retirement Research Foundation Scholarship
- RWJF Workshop on Immigration, Immigrants and Health, stipend support
- Okura Award

Resnick, Neil
- Best Doctors in America, 2016
- Best Doctors in Pittsburgh Award, 2016
- Member National Summit on Health Care, Washington DC, 2016

Rosano, Caterina
- Tenured Professor of Epidemiology
- Elected Member of the American Society for Clinical Investigation (ASCI)
- 2016 Invited Recipient, United Health Council
- 2016 Invited Recipient, Klein-Vogelbach Award for the Research of Human Movement

Sanders, Laurie
- Top Basic Science Poster Award, Annual Meeting OAIC 2016

Sejdic, Ervin
- Presidential Early Career Awards for Scientists and Engineers

Tyagi, Shachi
- R21 scored at 1st percentile

Minority Research at University of Pittsburgh

General Description of Minority Activities

We work with several local programs to recruit and retain applicants from underrepresented groups. These include our own Career Education and Enhancement for Health Care Research Diversity (CEED) Program and the School of Medicine's Diversity Office. The CEED Program was developed in collaboration with the Center for Health Equity Research and Promotion (CHERP) in direct response to the NIH's plan for CTSAs to develop programs that enhance minority recruitment and retention in clinical research. The CEED, one of the ICRE programs, provides training in grant application writing, presentation skills, and other research development skills necessary to junior faculty and postdoctoral fellows. Dr. Rubio, co-leader of the RCDC and DMAIC oversees the CEED program. The goal is to have Scholars in the CEED Program develop competitive career development proposals. The program also has exceptional potential to recruit, develop, and support junior faculty from underrepresented populations and serves as a model for other academic institutions. The CEED has been extended across the pipeline to include medical students and most recently residents and serves as a pipeline for recruiting underrepresented minorities into the Pepper Scholars Program. We have been successful in recruiting and retaining under-represented minorities. Since 2004 we have groomed RCDC trainees including 1 with disability (Cowan), 2 Native Americans (Spencer and Goins), 1 African American (Coley) and 4 Hispanic (Almeida, Ambrosia, Piva, Torres-Oviedo).

Based on efforts by the Schools of the Health Sciences (SHS) and Pitt administration, minority participation in the SHS training programs has increased over 10 years. With assistance from the Office of Health Sciences Diversity, the Center for Race and Social Problems (School of Social Work), and the CHERP, we advertise in major journals and newsletters as well as mailings to residency, fellowship and training directors, locally and nationally. We promote the program at national meetings, by advertisements, by word of mouth, and by targeted efforts at traditionally minority institutions with doctoral programs. We work to retain minority fellows by addressing barriers, providing didactic and research experiences, using our interest group on the mentoring of minorities to improve and enhance mentoring of minorities, promoting the NIH loan repayment programs, and providing protected time. We have extensive networking opportunities available through the SHS for minority students, residents, fellows, and faculty and will encourage all our minority scholars to take advantage of these venues.

Fabrisia Ambrosio, PhD, MPT is an Assistant Professor in the Department of Physical Medicine & Rehabilitation at the University of Pittsburgh. She holds secondary appointments in the Departments of Physical Therapy, Orthopaedic Surgery, and Microbiology &Molecular Genetics.

Dr. Ambrosio's research has the long-term goal of developing Regenerative Rehabilitation approaches to improve the skeletal muscle healing and functional recovery. Her laboratory uses murine and human models to investigate the underlying mechanisms by which targeted and specific mechanotransductive signals can be used to enhance donor and/or host stem cell functionality.Dr. Ambrosio's research has been supported by the NIH, the DOD, the Foundation for Physical Therapy, the Claude D. Pepper Older American's Independence Center, and the University of Pittsburgh Institute on Aging. In 2006, she was awarded a Scholar's position within

the K12 Comprehensive Opportunities in Rehabilitation Research Training program. In 2011, she was awarded a K01 Career Development Award from the National Institute on Aging of the NIH.

Sara Piva, PhD, PT, OCS, FAAOMPT is an Associate Professor, Physical Therapy Department, Assistant Professor, Clinical and Translational Science Institute. Dr. Sara Piva' research focuses on the effectiveness and mechanisms of rehabilitation interventions to improve function in patients with arthritis. She seeks to understand how muscle metabolism and function (muscle phenotype, fatness, strength) change in response to rehabilitation interventions and how these changes impact subject's functioning. She currently conducts research funded by NIH on the use of neuromuscular electrical stimulation to reverse muscle atrophy in patients with rheumatoid arthritis along with the effects of the intervention on skeletal muscle structure and physiology. She also conducts research funded by the Rehabilitation Institute on the effectiveness of intensive exercises and physical activity promotion on functioning and activity participation in patients after total knee arthroplasty.

She has been awarded a K01 career development grant from NIH-NICHD entitled Neuromuscular electrical stimulation in individuals with rheumatoid arthritis (RA). She has been involved in pepper pilot projects that have examined the effects of balance training on mobility of patients post total knee replacement. She was recently awarded funding from the University of Pittsburgh Rehabilitation Institute to test the effectiveness of a Comprehensive Behavioral Intervention to improve physical function, physical activity, maintain body weight, and decrease blood pressure in patient post total knee replacement. She is currently the Co-leader of a pilot award entitled "Peripheral nerve function changes with exercise intervention after local knee replacement" with Dr. Elsa Strotmeyer.

Gelsy Torres-Oviedo, PhD, is an Assistant Professor of Bioengineering. Her mentors include Drs. Mark Redfern and Patrick Sparto. She is focusing on motor adaptation for walking in older adults. She uses a split-belt treadmill to create novel environmental conditions and challenges. A pepper pilot has supported her to examine, "Understanding locomotor plasticity in older adults". She was awarded a National Science Foundation BRIGE grant to examine motor adaptation of human locomotion and balance control. She was recently awarded a grant from the American Heart Association entitled "Understanding patient-specific deficits causing step asymmetry post-stroke: a step towards personalizing gait rehabilitation".