

UNIVERSITY OF SOUTHERN CALIFORNIA

Overview

The University of Southern California (USC) is one of a small number of premier research institutions on which the nation depends for a steady stream of new knowledge, art, and technology. USC's annual research expenditures exceed \$550 million. It ranks 16th among all American universities and ninth among private American universities in federal research support. USC is rapidly expanding its research activity through a strategy that emphasizes collaboration across multiple disciplines and meeting societal needs such as preventing, detecting, and curing diseases; securing the nation and the world against the risk of both natural disasters and acts of terrorism; enhancing cross-cultural cooperation through communication among civic, religious, ethnic, and community institutions; and creating the means to educate both children and adults for a deeper understanding of science and math, languages and cultures, leadership, and justice.

These include 1) the Los Angeles County University of Southern California Medical Center, which is among the largest teaching hospitals in the United States and serves 50,000 inpatients and 750,000 outpatients annually; 2) the USC University Hospital system, called Keck Medical Center of USC, which includes Keck Hospital, a private teaching and research hospital with a 411 bed capacity, and USC Norris Cancer Hospital, which is designated by the National Cancer Institute as one of the nation's 40 comprehensive cancer centers; 3) Children's Hospital Los Angeles which receives 300,000 visits annually and ranks among the top five pediatric facilities in the nation; and 4) Rancho Los Amigos National Rehabilitation Center, which has an international reputation in rehabilitative care. Rancho is the highest ranked rehabilitation hospital in California and among the top 20 rehabilitation hospitals nationwide by *US News & World Report*.

USC owns or has affiliations with the following hospitals which serve the local population, which includes a large percentage of underserved, ethnically diverse individuals: 1) the Los Angeles County University of Southern California Medical Center, which is among the largest teaching hospitals in the United States and serves 50,000 inpatients and 750,000 outpatients annually; 2) the USC University Hospital system, called Keck Medical Center of USC, which includes Keck Hospital, a private teaching and research hospital with a 411 bed capacity, and USC Norris Cancer Hospital, which is designated by the National Cancer Institute as one of the nation's 40 comprehensive cancer centers; 3) Children's Hospital Los Angeles which receives 300,000 visits annually and ranks among the top five pediatric facilities in the nation; and 4) Rancho Los Amigos National Rehabilitation Center, which has an international reputation in rehabilitative care. Rancho is the highest ranked rehabilitation hospital in California and among the top 20 rehabilitation hospitals nationwide by *US News & World Report*.

The Division of Biokinesiology and Physical Therapy (BKN/PT) occupies more than 35,000 square feet on two floors in the Center for Health Professions building (CHP) on USC's Health Sciences Campus. In addition to extensive teaching facilities, the division houses 13 separate laboratories providing research space for faculty investigators. The Division includes 50 full-time faculty members and 59 adjunct faculty members. All full-time faculty are expected to do research or be scholars/leaders in an area of clinical practice. USC is ranked as the top physical therapy school nationwide by *US News & World Report*.

Division faculty members are engaged as principal investigators in clinical research activities with extramural funding in a variety of clinical research areas, including but not limited to: ACL injuries, patients with Cancer, patients with Cystic Fibrosis, barefoot runners, dexterity over a lifespan, infant and child development, low back pain, neuromuscular control, pelvic pain, patients with Stroke (upper extremity), patients with Parkinson's disease, and aging. Research staff positions include a full-time engineer who provides technical support in the laboratories as well as two full-time research administrators who provide assistance with all of the Division's research activities. The Division has the expertise and infrastructure to support the administration of numerous research projects. Currently, the Division oversees research grants that total approximately 2.5 million dollars in annual funding.

The distinct laboratories housed in the Division include: (1) Motor Behavior and Neurorehabilitation (Director: Carolee Winstein) – behavioral testing and motion analysis; (2) Computational Neurorehabilitation and Learning (Director: Nicolas Schweighofer) – computational modeling, robotics; (3) Neuroplasticity and Imaging (Director: Beth Fisher) – transcranial magnetic stimulation; (4) Motor Control Development (Director: Nina Bradley) – motion analysis in chick embryos; (5) Musculoskeletal Biomechanics (Directors: Kornelia Kulig, Chris Powers & George Salem) – 3-D motion analysis with 8-camera Vicon system, force plates, EMG, ultrasound imaging of soft tissue, strength and flexibility testing; (6) Clinical Exercise Research Center (Director: Todd Schroeder) – metabolic, cardiovascular, pulmonary, body composition, bone density, strength, and physical function testing; (7) Brain-Body Dynamics (Director: Francisco Valero-Cuevas) – biomechanics, neuromuscular control and clinical rehabilitation of human mobility, with an emphasis on dexterous hand function; (8) Development of Infant Motor Performance (Director: Linda Fetters) – motion analysis of the development of infant and child action abilities, intervention with infants and children with disabilities; (9) Applied Mathematical Physiology (Director: Jason Kutch) – neural mechanisms for muscle activation, engineering of non-invasive systems to study human motor function, and neuromuscular chronic pain disorders; (10) Women’s Health and Exercise Lab (Director: Christina Dieli-Conwright) – research spanning the spectrum from basic to clinical and translational science with a concentration on the hormone-related pathways in muscle hypertrophy and strength development, and metabolic diseases affecting cancer (i.e., breast, ovarian) survivors; (11) Human Performance Laboratory (Director: Susan Sigward) – typical and impaired mechanics as they pertain to safe and optimal participation in sports and physical activities; (12) Infant Neuromotor Control Laboratory (INCLab) (Director: Beth Smith) - studies the development of neural control of movement during infancy and evaluates interventions for neural and functional development in infants with or at risk for developmental delay; (13) Locomotor Control Laboratory (Director: James Finley) - interested in understanding how locomotion is controlled and adapted in both the healthy and injured neuromuscular system; (14) Clinical Biomechanics Orthopedic and Sports Outcomes Research (Director: Lori Michener) – examines the diagnosis and treatment outcomes of upper quadrant disorders via clinical trials and to elucidate the mechanisms of shoulder disorders to facilitate the design of interventions to reduce shoulder pain and restore the ability to perform activities and participate at work, home and sports.

USC’s Division of Biokinesiology and Physical Therapy is committed to the advancement of evidence-based practice in rehabilitation. Over the past five years, the Division has moved strategically to develop a comprehensive capability and reputation for conducting clinical research trials. This has been quite successful and a major reason for the dramatic increase in research funding coming to the Division. Nevertheless, to continue to develop our capability in this area, the Division established the Bice Clinical Research Center, a specially designed facility for testing human research subjects and patients. A key aspect of this facility is that it has attractive and comfortable amenities for patients and their families so that they will continue to participate in the Division’s clinical research projects. A dedicated clinical research center enables the Division’s research faculty to continue to attract collaborators and to be successful in obtaining outside funding for clinical research. The Center was named for Ms. Kathleen Bice’s father, in recognition and gratitude for her pledge of the lead gift of \$150,000 to establish the Center. Ms. Bice is an alumna of the class of 1969 and a former Division Assistant Chair. Ms. Bice was also the inaugural chair and current Board member of the Division’s Board of Councilors. The Center currently houses six separate areas of research, i.e. six separate rooms that are all in use by junior and senior faculty combined conducting five separate federally and locally funded projects. These projects include, for example, motor development in infants, elderly aging with a disability and aging into disability, and the evaluation on neural control in upper extremity tasks in elderly patient populations.

The Division of Occupational Science and Occupational Therapy (OS/OT) occupies 20,636 square feet on two floors in the CHP building on USC’s Health Sciences Campus and an additional 5,186 square feet at the Center for Occupation and Lifestyle Redesign and two other locations on the University Park Campus. The Division employs 70 full-time and 4 adjunct faculty members. The rigorous, interdisciplinary research programs at the USC Division of Occupational Science and Occupational Therapy have cumulatively received over \$14 million of federal funding. The group of extramural funded research programs has addressed health-care disparities, cultural competency, and maintenance of wellness and prevention of secondary conditions in a variety of ethnically diverse, underserved populations. Research support is provided by eight full-time staff as well as by faculty experts in the analysis of quantitative and qualitative data who serve as consultants as

needed. All funded research programs have dedicated laboratory space. The Division also provides high quality occupational therapy services throughout the University-owned hospitals as well as outpatient services housed in a state-of-the-art clinical site on campus.

OS/OT owns a modern digital data lab, located in the CHP building, with equipment available for transcribing, digitizing, cataloguing, and storing both audio and video information. Specialized software allows audio and video data to be linked with transcriptions and thematic codings, which facilitates immediate retrieval and review of relevant interviews or video observations with password-protected access from workstations throughout the Division. The Division also houses a pediatrics psychophysiology laboratory for evaluating sensory processing deficits in children.

The Viterbi School of Engineering has over \$170 million in external funding, which situates the school among the highest in the nation in regards to research activity volume. The School's graduate program perennially ranks within the top 10 nationally, according to *U.S. News and World Report* rankings. More than one-third of its 168 faculty members are designated as fellows in their respective professional societies and 30 of its faculty members have been elected to the National Academy of Engineering. Currently, within the Viterbi School of Engineering, there are about 4,000 graduate students pursuing degrees in more than 25 fields.

Rehabilitation Engineering Research Center for Technologies for Successful Aging with Disability (RERC). In 2008, USC secured extramural funding from NIDRR to establish a Rehabilitation Engineering Research Center (RERC). Led by Carolee Winstein (K12 Lead Faculty), the acquisition of this grant was the result of collaboration between many interdisciplinary faculty across the University. The name of this RERC, which reflects its overarching objective, is Optimize Participation Through Technology (OPTT). The OPTT-RERC is designed to enhance the lives of individuals aging with and into disability through development and delivery of cutting-edge technologies. To achieve this objective, the Center employs state-of-the-art data management, dissemination, and performance evaluation techniques which are overseen by a multidisciplinary team of experts in clinical rehabilitation, engineering, and gerontology, as well as a select group of technology partners and disability advocates. In aligning USC clinical and technological strengths into an integrated infrastructure to provide training opportunities for future rehabilitation researchers, the OPTT-RERC encompasses four technology domains across four primary project areas composed of a combination of research (R) and development (D) activities. Each of the RERC projects addresses the needs of individuals aging with and/or into disability, using innovative and integrated approaches as part of the synergistic partnership between rehabilitation, engineering, and clinical researchers within BKN/PT, OS/OT, the Viterbi School of Engineering, the Information Sciences Institute, the Institute for Creative Technologies, the Rossier School of Education, the Davis School of Gerontology, the Keck School of Medicine, and Rancho Los Amigos National Rehabilitation Center.

The Physical Therapy Clinical Research Network (PTclinResNet) was established in 2003 through a grant awarded by the Foundation of Physical Therapy to Carolee Winstein, a Primary Research Mentor for the currently proposed project. PTclinResNet is a multisite clinical research network that interlinks five premier centers of physical therapy research and practice. Joining USC in this clinical research endeavor are Northwestern University, Rancho Los Amigos National Rehabilitation Center, Southwest Missouri State University, and the University of California at Los Angeles. These centers have come together through the network to carry out four clinical research projects that share a common theme: to assess the effects of strength-training exercises that are designed to improve muscle performance and movement skill in patients with physical disabilities. One of the projects, STEPS (Strength-Training Effectiveness Post-Stroke), is a Phase III multi-center RCT designed to demonstrate intervention efficacy. The remaining three projects are Phase I clinical trials which are smaller in scale and have been used to establish the feasibility and safety of interventions with a limited number of patients. These projects are named: PEDALS (Pediatric Endurance Development And Limb Strengthening), MUSSEL (Muscle-Specific Strengthening Effectiveness Post Lumbar Microdiscectomy), and STOMPS (Strengthening And Optimal Movements For Painful Shoulders in chronic spinal cord injury).

PTClinResNet has three primary goals. The first is to evaluate the effects of strength training for the physically disabled. The second is to create the infrastructure necessary to sustain clinical research in physical therapy. A final goal is to provide education and training opportunities for present and future clinical scientists in physical therapy. PTClinResNet has built support for evidence-based practice in the area of strength training as well as other types of PT interventions.

The Center for Robotics and Embedded Systems (CRES) was established in Fall of 2002. It is an interdisciplinary ORU in the USC Viterbi School of Engineering, and focuses on the science and technology of effective, robust, and scalable robotic systems, with broad and far-reaching applications. CRES facilitates interdisciplinary interactions and collaboration through its robotics faculty and its large team of interdisciplinary affiliates, and serves as a linchpin for strategic research areas at USC. CRES projects span the areas of service, humanoid, distributed, reconfigurable, space, and nano robotics and impact a broad spectrum of applications, including assistance, training, and rehabilitation. The Center provides a tight-knit foundation for collaboration and opportunities for education and outreach. The Interaction Lab was established in 1995 by Maja Mataric (K12 Lead Faculty) to investigate control and learning in mobile robots and multi-robot systems and is now part of the CRES. As the Interaction Lab has grown, its focus of study has also evolved. Currently, the work is centered on socially assistive robotics, spanning problem areas including human-robot interaction (HRI), human-robot team interaction, human activity modeling, imitation learning and teaching, and therapeutic and educational uses of socially assistive robots.

The Brain-Body Dynamics Lab, housed in the Viterbi School of Engineering and BKN/PT, is overseen by Francisco Valero-Cuevas (K12 Lead Faculty). The lab is dedicated to understanding the biomechanics, neuromuscular control, and clinical rehabilitation of human mobility, with an emphasis on dexterous hand function. Experimental approaches range from EMG recording and custom-made virtual reality modules to mapping the function of the human brain with fMRI. These procedures inform theoretical work to characterize complex sensorimotor function through rigorous and anatomically faithful mathematical models.

The Biomimetic Microelectronic Systems Engineering Research Center (BMES ERC) was established at the Viterbi School of Engineering in 2003 as part of a ten-year cooperative agreement with the National Science Foundation. The BMES ERC brings together experts from both medicine and engineering to develop microelectronic systems that interact with living, human tissues. In these innovative systems, microelectronics such as bionic neurons (BIONs) are used to mimic and replace damaged and diseased structures in the human body. The resulting technology will allow bi-directional communication with tissue, thereby enabling implantable, portable devices to treat presently incurable diseases such as blindness, loss of neuromuscular control, paralysis, and declining cognitive function.

The Laboratory for Virtual Reality, Psychology, Rehabilitation, and Social Neuroscience (VRPSYCH lab), located within USC's Institute for Creative Technologies (ICT), is engaged in a broad program of research on the brain mechanisms that underlie neurocognitive functioning and emotion regulation in persons throughout the life course. The lab is overseen by Skip Rizzo. It makes use of virtual and augmented reality to study associations between the essential neural correlates of cognitive functioning and emotion regulation as a means of uncovering the mechanisms of brain-behavior relations. Included among the clinically relevant topics that it has recently studied are mood and anxiety disorders, stroke, mild traumatic brain injury, ADHD, autism, Alzheimer's, and pain distraction.

The lab is committed to the vision that the use of virtual and augmented reality is an essential component in the evolution of medical rehabilitation and psychological sciences in the digital age. The lab specializes in the development of archetypical virtual environments (e.g., offices, homes, social environments) applied to a wide range of clinical and scientific research questions.

The Statistical Consultation and Research Center (SCRC) within the Division of Biometry, Keck School of Medicine, is directed by Stanly Azen (K12 Lead Faculty). The SCRC, an organized research unit (ORU) at USC, consists of a team of statisticians, epidemiologists, programmers, project coordinators and data managers which provides assistance to both the public and private sectors in carrying out clinical and

prevention trials, observational and retrospective studies, and cross-sectional and longitudinal surveys. Members of the SCRC are co-investigators on a range of studies in atherosclerosis, cancer, diabetes, neuroscience, ophthalmology, alternative medicine, and other health-related areas. These faculty provide ongoing consultation in clinical research design, statistics and methodological research. Through its affiliation with the Division of Biometry, the SCRC offers the set of courses that can be taken to obtain a Certificate in Clinical and Biomedical Investigations.

The Department of Regulatory Science in the USC School of Pharmacy serves both full and part-time students interested in expanding their knowledge of regulatory affairs, clinical research, and quality systems. The program is recognized for its excellence in developing leaders in regulatory science in industry, government, and academia. Through this Division, trainees will be able to complete coursework that will lead to a Certificate in Clinical Trial Research Design and Management.

The Office for the Protection of Research Subjects (OPRS) was established at USC in 2004 to create a University-wide Human Subjects Protections Program (HSPP) that is excellent, innovative, dynamic, and ranked among the nation's best. The OPRS strives not only to meet but to exceed regulatory and ethical requirements for all human subjects research activities. A primary goal for the OPRS is to achieve and maintain AAHP accreditation. Accreditation requires the creation and implementation of best practices at all levels of the HSPP and continued improvements to maintain excellence.

The Research Center of Excellence in Minority Obesity in Youth was established at USC's Keck School of Medicine in 2007 through a grant awarded by the National Center on Minority Health and Health Disparities. The Center focuses on research, translation and training to improve minority health in Hispanic and African-American youth, with a major emphasis on exploring innovative ways to identify, prevent and reduce minority health disparities related to obesity, especially type 2 diabetes and cardiovascular disease. It is based on the principle that obesity and associated disease risk is apparent early in life, and therefore novel interventions that target children and adolescents are essential public health strategies for reducing the burden of disease risk in adulthood. The Center, with broad support from USC and its affiliate, the Childrens Hospital of Los Angeles, is led by Michael Goran (K12 Lead Faculty), and Lourdes Baezconde-Garbanati, who both have an impressive track record in minority health research.

The Brain and Creativity Institute and the **Dornsife Cognitive Neuroscience Imaging Center** were established at USC in 2006 and are units of the College of Letters, Arts and Sciences. These interconnected world class facilities promote investigation of the relation between neural and mental phenomena in humans and emphasize how human experience is perceived, interpreted and shaped. Research projects focus on uncovering the neurological underpinnings of mental functions from emotion and decision making to innovation and creativity. Scientists at the Institute and Center are also interested in how these functions interact with genetics and biological parameters to affect well-being and disease progression. The Imaging Center houses a Siemens Magnetom Trio TIM 3T full-body MRI scanner with capability for structural and functional imaging, student workspace, and computers with Brain Voyager and Matlab software for data storage and analysis. *USC Occupational Therapy faculty, Lisa Aziz-Zadeh, is based in this facility and has ongoing access to its resources.*

The USC University Center for Excellence in Developmental Disabilities (USC UCEDD), founded in 1966, is a renowned leader in the identification and support of cutting-edge services for individuals with, or at risk for, behavioral and/or developmental disabilities and their families. The Center, which is headquartered at Childrens Hospital of Los Angeles, is composed of three distinct divisions, each with a unique focus. The Center for Disability Studies and Community Inclusion creates systems which strive to promote full community inclusion and participation of people with development disabilities by focusing on deinstitutionalization, housing, special and general education, transition services, access to health care, family support, culturally competent systems of service, engineering and technology solutions, and advocacy. The Center for Child/Family/Health Initiatives and Leadership Development (CHILD) is home to the Leadership Education in Neuro-Developmental Disorders (LEND) graduate training program which includes input from eleven disciplines and operates several clinics for training purposes in such areas as feeding, nutrition, and access to

care. The Center for Community Mental Health (CMH) provides direct services to children with mental health problems, dual diagnosis, and related disorders and their parents through its nationally accredited psychology training program. Psychiatry, social work, occupational therapy, and nursing are all represented in the CMH service delivery model.

Rancho Los Amigos National Rehabilitation Center (RLANRC), although already referred to as a hospital resource, is highlighted here because of its strategic role in facilitating the ability to conduct rehabilitation clinical trials. RLANRC is a 395 bed hospital specializing in the rehabilitation of people with disabling injury and illness. Not only is it internationally renowned in the field of medical rehabilitation and consistently ranked among the top rehabilitation hospitals in the United States by *U.S. News & World Report*, but it is also one of the nation's largest comprehensive rehabilitation centers. As a branch campus of USC, RLANRC is affiliated with its Schools of Medicine, Dentistry, OS/OT and BKN/PT. It is also affiliated with colleges and universities across the United States for training in the rehabilitation professions.

Inpatient admissions average 2,300 annually. Outpatient visits number 53,000 among multiple rehabilitation and medical specialty clinics. The medical staff is composed of physicians and dentists representing the full range of specialties required for the care of the catastrophically disabled. As a Los Angeles County facility it tends to serve individuals with severe disabilities from ethnically diverse and low income populations.

RLANRC has been a pioneer in the interdisciplinary approach to patient care. Patients are treated by highly specialized teams dedicated to specific disability categories such as spinal cord injury and brain injury. This level of expertise is supported by millions of dollars in grant and research monies administered by the Los Amigos Research and Education Institute, Inc. (LAREI). Several K12 Lead Faculty are currently conducting clinical trials in collaboration with rehabilitation experts at RLANRC.

Zilkha Neurogenetic Institute (ZNI), established in 2003, is an integral part of a broader USC neuroscience initiative promoting collaboration between researchers from diverse disciplines. Scientists at the Institute reach across boundaries to embrace methods and techniques from other fields of study, identifying new approaches to examine nervous system function so we may all better understand the underlying causes of neurological and psychiatric disorders.

The Zilkha Neurogenetic Institute was designed to foster interactions among the best and brightest. At this world-class center for research excellence, USC faculty, fellows, and graduate students study the brain from a range of perspectives, from the molecular to the systems level—applying their backgrounds in cell and neurobiology, physiology and biophysics, genetics, neural engineering, and cognitive neuroscience to influence and engage each other's views on neurogenetic disease.

Clinical and Translational Science Institute (SC CTSI) promotes translation of scientific discoveries into new tools for clinical and community health. Created by the US National Institutes of Health (NIH), the SC CTSI is one of 55 research institutes nationwide that aim to speed research from laboratories to sustainable public health solutions. Our focus: improving the health of diverse populations in urban settings like Los Angeles.

The SC-CTSI is a partnership among leading Southern California academic, clinical and community health organizations that jointly are working to identify major regional health problems – and to direct world-class researchers and health care providers to develop new solutions for those problems.

We provide resources for developing new diagnostic and therapeutic tools, testing new approaches in clinical and community settings, and disseminating successes to clinical and community health practitioners. These research resources are supported by state-of-the art programs in information sciences, regulatory science and ethics.

The SC-CTSI also provides clinical and translational research education. Our activities are creating new translational researchers, sustainable interdisciplinary research teams, new approaches to health for the

communities we serve – and a cooperative spirit of research and potential solutions for urban residents in need of novel health solutions.

Biomimetic Microelectronic Systems (BMES) Engineering Research Center (ERC) is a research center dedicated to the development of implantable microelectronic devices for the treatment of presently incurable diseases. Our strategy is to use internally developed microelectronic and biomedical technologies to create novel interventions for ophthalmic, neurological and other systemic disorders. We are a consortium of three primary academic institutions, a few supporting institutions and government research labs, and a handful of industry partners all dedicated to the creation and advancement of novel, cutting-edge medical technologies.

The BMES is devoted to the science and engineering of novel biomimetic microelectronic systems (BMES) based on fundamental principles of biology. The newly developed systems will allow bi-directional communication with tissue, organs and systems, and thus enable implantable/portable microelectronic devices to treat presently incurable human diseases such as blindness and memory loss. The overall technical merit of this center lies in developing disruptive rather than incremental advancement in technology.

In keeping with the spirit of the ERC program, the center maintains three major initiatives: 1) A dedication to development of cutting edge research for the development of new medical technologies, 2) A commitment to community outreach and education to promote science, medicine and engineering awareness and interest, and 3) A strong interest and effort in formation and management of relationships with industrial partners to advance commercialization of technologies and to foster student-industry relationships.

Leonard D. Schaeffer Center for Health Policy and Economics, established in 2009, is the result of a unique collaboration between the USC School of Policy, Planning, and Development (SPPD) and the USC School of Pharmacy. For the first time, this new Center brings together health policy experts from SPPD, a seasoned pharmacoeconomics team from the School of Pharmacy, and other affiliated faculty and scholars from across USC and a number of other distinguished universities. The Center is led by Dana Goldman, the Norman Topping Chair in Medicine and Public Policy, at USC. A core faculty of three distinguished colleagues, Darius Lakdawalla, Neeraj Sood, and Geoffrey Joyce, oversee the domestic, international and policy research programs, respectively. The Center is committed to developing exceptional human and technical capacity to conduct interdisciplinary research, policy analysis, and training.

The Center's vision is to become a premier research and educational institution recognized for innovative, independent research and significant contributions to policy development and health care system improvement. Its mission is to promote health and value in health care delivery by conducting rigorous research and policy in the United States and internationally. With its extraordinary breadth and depth of expertise, the Center will have a vital impact on the transformation of health care.

USC Ethel Percy Andrus Gerontology Center, founded in 1964, is the first major research institution in the nation devoted entirely to the study of aging. Interdisciplinary investigations in neurobiology, molecular biology, cognitive psychology, biodemography, family studies, long term care and other topics encompass the breadth of ongoing research at the Center.

The primary research goal of faculty is to shed new light on the multiple processes of aging and to better understand the implications of these processes for individuals, families, organizations and society. Their investigations generate knowledge – describing, comparing and predicting the progression of normal and pathological human development. A second objective is to bridge the gap between theory and practice through programs of continuing education, policy-related research and community service.

The Andrus Center has a proud history of research in gerontology as it relates to the disciplines of neurology, social and behavioral sciences and policy and services. Within each field, faculty members develop grant proposals and coordinate research. Studies are conducted in laboratories within the Center, throughout local communities and on a national level.

Animal Resources

USC is a leader in the ethical and humane use of animals for research and teaching. USC is fully accredited by the Association for the Assessment and Accreditation of Laboratory Animal Care, International (AAALAC) and has an animal welfare assurance (number A3518-01) on file with the NIH Office of Laboratory Animal Welfare. The Institutional Animal Care and Use Committee review all applications to ensure ethical and humane treatment of animals. This body follows the Guide for the Care and Use of Laboratory Animals (National Research Council, 1996) and all applicable government regulations including those of the U.S. Department of Agriculture and the State of California."

Library Systems

The USC Libraries actively support the discovery, creation, and preservation of knowledge. The Libraries develop collections and services that support and encourage the academic endeavors of faculty, students, and staff; build a community of critical consumers of information; and help develop engaged world citizens. USC has 23 libraries and information centers and the USC Digital Library.

The Norris Medical Library is located on the Health Sciences Campus, adjoining the LAC+USC Healthcare Network, the Zilkha Neurogenetic Institute, and the Institute for Genetic Medicine. The library contains 168,185 volumes and receives 1,935 current periodicals. The library serves the Keck School of Medicine, the School of Pharmacy and the Divisions of Biokinesiology and Physical Therapy, and Occupational Science and Therapy.

Training and Career Development

USC is committed to training graduate students, postdocs, and junior faculty for successful careers in research. An example of this is the Divisions of Physical Therapy and Occupational Therapy received a T32 from NIH/NCMRR (TREET: Training in Rehabilitation Efficacy and Effectiveness Trials) with a focus on training postdoctoral fellows to conduct randomized clinical trials relevant to rehabilitation practice (Director F. Clark. Co-Directors, S. Azen, J. Gordon). The T32 program provides a coordinated postdoctoral training experience that includes individualized mentorship plans, core coursework, participation in training seminars, immersion in externally funded projects, and writing of grant proposals and research publications. The training is organized around five core themes: (1) the identification of effective interventions for children (pediatric rehabilitation); (2) protective and risk factors in adults with disabilities; (3) the rehabilitation and subsequent reintegration of people with disabilities into the community (acute and community-based rehabilitation); (4) applications of innovative technology; (5) neurorehabilitation. Anticipated trainee outcomes include an increased capacity to independently conduct randomized clinical trials and an increase in the quantity and rigor of rehabilitation science publications.

USC also has multiple clinical and translational NIH-funded training grants as well as individual NIH fellowship grants (see table below).

Funding Source	Identifying Number	Title of Training Program	Program Director	Project Period
NIH/NIDCD	T32 DC009975	Training in Hearing & Communication Neuroscience	S. Bottjer	7/01/09 – 6/30/14
NIH/NICHHD	T32 HD060549	Training in Developmental Biology, Stem Cells and Regeneration	C.M. Chuong, M. Pera, H. Suvoc	5/01/11 – 4/30/16
NIH/NICHHD	T32 HD064578	TREET: Training Rehabilitation Efficacy and Effectiveness Trials	F. Clark, J. Gordon, S. Azen	5/01/11 - 4/30/16
NIH/NCI	T32 CA009492	Training Grant for Cancer Control and Epidemiology	M.A. Pentz	9/1/84 – 7/31/15
NIH/NIDDK	K01 DK084258	Brain Reward as a Link Between Insulin Resistance and Weight Status in Hispanic Children	T. Adam M. Goran	9/15/11 – 6/14/15

NIH/NCRR	KL2 RR031991	Los Angeles Basin Clinical and Translational Science Institute	T. Buchanan	7/01/10 – 3/31/15
NIH/NIEHS	K25 ES019224	Mobile Sampling of Air Pollutants to Assess Exposure in a Large Cohort of Children	S. Fruin	9/1/10 - 4/30/15
NIH/NEI	K08 EY021485	Zebrafish Model of Human Corneal Development and Disease	J. Heur	5/1/11 – 4/30/16
NIH/NIDDK	K25 DK087931	Expanding the Application of MRI for Body Fat Studies in Humans	H. Hu	4/1/10 – 3/31/14
NIH/NIDA	K08 DA025041	Affective and Genetic Correlates of Amphetamine Response	A. Leventhal	8/1/09 – 7/31/14
NIH/NIDDK	K23 DK092702	Mechanisms underlying Increased Risk for Obesity and Diabetes in Hispanic Children Exposed to Maternal Diabetes in Utero	K. Page T. Buchanan	8/2/11 – 4/30/16
NIH/NICHHD	K01 HD057987	Preventing Medical Neglect of Children in Child Welfare	J. Schneiderman	7/01/09 – 6/30/14
NIH/NEI	K08 EY020863	Role of Trabecular Meshwork Contractility in Modulating Outflow Resistance	C.H. Tan	9/30/10 – 8/31/14
NIH/NIAAA	K01 AA020524	Notch Signaling in Nos2 Activation and Steatohepatitis by Obesity and Alcohol	J. Xu	8/20/11 - 7/31/16