



Annual Report FY 2007-2008

Stanford Center on Longevity Annual Report FY 2007-2008

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Executive Summary

Executive Summary

Introduction

In less than one century, life expectancy increased by an average of 30 years in developed regions of the world. Combined with a reduction in fertility rates over the same period, these changes in age distribution – both nationally and internationally – are dramatic and unprecedented. Quite suddenly, there are more people living longer in the world than ever before in human history and they are accounting for an increasingly greater percentage of the world population. Improved longevity is, at once, among the most remarkable achievements in all of human history and one of our greatest challenges.



The Stanford Center on Longevity

The Stanford Center on Longevity (SCL) was created in 2006 by a group of Stanford professors intent on transforming human longevity through the application of existing knowledge, the encouragement of targeted scientific breakthroughs, and the establishment of key partnerships outside of the university in an effort to modify the culture of aging.

The premise for the SCL is that whether longevity is a benefit or a burden hinges on the status of long-lived people. To the extent that long-lived people are physically fit, mentally sharp and financially secure, societies will thrive. To the extent that older people are frail, dependent on the care of others and impoverished, the well-being of entire societies will be diminished. The SCL is determined to fundamentally change the culture of aging in order to help the most people achieve the best possible quality of long life. In that quest, the Center will benefit people of all ages.

The SCL is committed to being a catalyst for change: we identify challenges associated with increased life expectancy through a global lens; support scientific and technological research concerning those challenges; and coordinate efforts among researchers, policy makers, entrepreneurs, thought leaders, the media and the general public to find effective solutions. We also engage directly with those in the creative community whose imagination shapes cultural norms. The cornerstone of the Center is the belief that combining scientific and technological discoveries with swift entreprenerial action is the way to address the challenges of aging societies.

Fundamental to the success of the SCL has been the extraordinary generosity and vision of Richard Rainwater, and the wisdom and assistance of Paul Brest, President of the William and Flora Hewlett Foundation. Stanford University's support in the Center has been immeasurable, particularly that of President John Hennessy, Provost John Etchemendy, and the Office of the Dean of Research. In addition, the former and current Deans of Research, Arthur Bienenstock and Ann Arvin, respectively, have been extraordinarily supportive.

The First Years of the SCL

In the two years since its founding, the SCL has established itself as a unique organization that pairs research with entrepreneurial action. The SCL takes advantage of Stanford's unusually broad range of world-class research programs to take a comprehensive approach to longevity. We support basic research and training, as many university-based centers do, but we also are dedicated to using research to solve practical problems that face aging individuals and societies.

The theme that permeated the SCL's second year was strategy. We challenged ourselves to identify ways in which we could maximally use our resources to address key challenges of aging while achieving the greatest possible impact. We do not want to be redundant to other successful efforts underway and we want to pursue problem areas in which we have considerable expertise. Following intensive self-study as well as assessing our unique strengths and matching them to pressing societal needs, we organized the SCL around three divisions and two programs. Divisions reflect our belief that to the extent that people arrive at old age physically fit, mentally sharp and financially secure, problems of aging fade away. In the Divisions, we target research and policy to address practical problems of aging. Programs reflect our belief that empirical analysis can and should inform private and public sector activities. Programs are aimed at speeding the adoption of best practices for aging societies.

Divisions:

The Mobility Division: One of the major impediments to productive longevity is mobility. When physical mobility of older people is lost, individuals and communities face sweeping personal and social consequences. SCL faculty are conducting research that includes understanding the basic biology of stem cells in muscle repair; the mechanics of crucial joints such as knees and hips; assistive technologies such as robots; and public transportation and urban planning.

The Mind Division: The potential loss of mental abilities is a serious concern for aging individuals. If rates of dementia remain unchanged, we will face a major public health crisis. Scientists at the SCL are seeking to slow age-related changes in the speed and efficiency with which people process information, and also are working to identify areas of growth, such as increased knowledge about the world, that may offset declines.

The Financial Security Division: Across the same years that life expectancy increased, individual savings rates in the U.S. decreased. The SCL is undertaking research on products, technologies, and financial education that will help people better plan and save for their futures. The SCL will pursue research on psychological barriers to long term planning and economic incentives to saving, in order to help people be financially secure throughout life.

Programs:



Politics, Scholars and the Public (PSP) Program: Because some of society's most important challenges are best resolved through change in public policies, the SCL has created the program: "Politics, Scholars and the Public." In this unique approach to collaborative policy making, we involve Republican and Democratic political experts as well as voters to explore ways to break logjams that are preventing needed reforms. We bring together academic, political and policy experts with significant segments of the public to dialogue about the pros and cons of relevant

policy solutions to pressing societal challenges. The premise is that sensible solutions result not only from the participation of informed academic, policy and political experts, but also from an informed public.

The Global Aging Program: Worldwide demographic trends are creating significant differences between younger and older populations within countries and across geographical regions. The SCL addresses risks and opportunities of population aging and its impacts on global economics, environmental sustainability and international security. Some key trends: Most advanced economies will face shrinking workforces. Aging in developing countries will take off in less than 10 years. The potential for civil unrest is greatest in Africa and the Middle East, where economies are unable to support predominantly younger populations.



Year Two Highlights (FY 07-08)

The People of the SCL: SCL formed an External Advisory Council to advise the work of the SCL. Also, leadership and faculty affiliates gave numerous lectures and presentations about longevity across the country.

The SCL on the Stanford Campus: In addition to continuing activities started in Year One (courses, postdoctoral fellowships, student practicums) the SCL collaborateds with the Center for Primary Care and Outcomes Research (PCOR) (conference on "Better Health, Lower Cost: Can Innovation Save Health Care Reform?") and the Office of Religious life (discussion with Sandra Day O'Connor).

The SCL's External Activities: The SCL co-sponsored the meetings of the Gerontological Society of America; and met with Global Aging experts across the country. The SCL was featured in <u>Forbes</u>, <u>Money</u>, the <u>New York Times</u>, and the <u>LA Times</u>, and successfully established itself as a trusted resource for journalists and media outlets.



Mission and History

Mission and History

Mission

The Stanford Center on Longevity is committed to bringing about profound improvements in the quality of life for people living longer. The Center accomplishes this goal by supporting and encouraging research projects across many academic disciplines, and translating breakthroughs to the public. Rather than focus on ways to cope with aging, SCL aims to modify human aging itself and improve the quality of life for people of all ages. The SCL builds partnerships with business, government and non-profit thought leaders in order to quickly and effectively provoke advances in human aging.



History and Funding



The planning process for the SCL was formally initiated by Stanford's Provost John Etchemendy in 2004, with encouragement and financial support from Paul Brest, President of the William and Flora Hewlett Foundation.

The concept for the Center was developed by a committee of faculty representing the schools of Medicine, Business, Law, Humanities and Sciences, Education and Engineering. In 2005, the initiative was approved by Stanford's President and the Board of Trustees.

In January 2006, the SCL was designated as an Independent Laboratory that reports to the Dean of Research. Professor of Psychology, Laura Carstensen, was appointed Director of the SCL. Associate Professor of Neurology, Thomas Rando, was appointed Deputy Director.

The remarkable speed with which the SCL has been established reflects a generous gift from Richard Rainwater, who early in the process recognized the need for and the potential of such an effort at an elite university. These funds allowed the work of the SCL to begin immediately.

Space

Provost Etchemendy first authorized temporary space for the SCL in Wallenberg Hall. As staffing grew, the Center moved to Encina Hall, where it occupies the East Wing/5th floor. Encina Hall is prime, on-campus space with excellent meeting facilities and parking for visitors. In the 2009-10 academic year, the Center will move to Landau Hall.



Enlisting the Efforts of Stanford Faculty

Stanford University encompasses expertise in an unusually wide range of fields related to longevity. Over one hundred faculty members are now SCL affiliates, representing biology, business, economics, engineering, education, journalism, law, earth sciences, medicine, psychology, and other fields. The breadth of expertise available at Stanford allows us to take a comprehensive approach that can address issues ranging from vision, hearing and mobility to cultural issues including work, parenting and retirement.

From its first year, SCL established a faculty steering committee to advise the SCL and began to build partnerships with other related research centers at Stanford, such as the Center on Demography, the Stanford Institute for Economic Policy Research, the Freeman Spogli Institute, the Center for Health Policy and the Center for Primary Care and Outcomes Research, and the Center for Advanced Decision Making and Aging, which Laura Carstensen co-directs with Professor Alan Garber. We are examining ways in which other major interdisciplinary initiatives at Stanford share common aims with the SCL. The psychological exploration of long-term planning and sustainability, for example, falls within the scope of the Environmental Initiative and the Woods Institute, as well as the SCL.

Stanford faculty enjoy a high degree of collegiality and joint efforts occur frequently. The SCL helps faculty to accomplish their goals by aligning their work, where appropriate, with SCL objectives. The expertise of SCL's senior academic staff is offered to assist faculty in finding practical applications for their research and establishing relationships outside the university.

Ongoing meetings with small groups of faculty affiliates help us brief faculty about SCL aims and resources. Stanford faculty also join with the SCL in publicizing longevity-relevant research findings. The SCL occupies a central role at Stanford by supporting post-doctoral fellows with interests in longevity research, providing seminars, talks and lectures, offering seed funding for innovative research projects, and developing business and public policy strategies.



People of the SCL

People of the SCL

The SCL is led by a Faculty Director, Laura Carstensen, and Deputy Director, Thomas Rando. High-level senior and associate staff lead the key divisions and programs of the Center. The SCL is supported by prominent members of the Stanford University administration, and a Faculty Steering Committee. An External Advisory Council provides guidance related to the Center's work. In addition, the Center has more than one hundred Faculty Affiliates drawn from the Stanford faculty.

Leadership



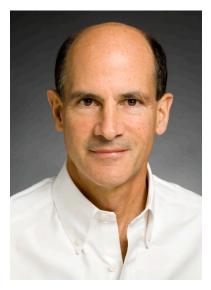
Laura L. Carstensen, Ph.D., is Professor of Psychology, where she is also the Fairleigh S. Dickinson Jr. Professor in Public Policy. For more than twenty years her research has been supported by the National Institute on Aging, and in 2005 she was honored with a MERIT award. Carstensen is best known for socioemotional selectivity theory, a life-span theory of motivation. With her students and colleagues, she has published well over 100 articles on life-span development. Her most current empirical research focuses on ways in which motivational changes influence cognitive processing.

Dr. Carstensen is a fellow in a number of professional organizations including the Association for Psychological Science, the American Psychological Association and the Gerontological Society of America. She serves on the Board of

Science Advisors to the Max Planck Institute for Human Development in Berlin, Germany and has chaired two studies for the National Academy of Sciences, resulting in The Aging Mind and When I'm 64. She is a member of the MacArthur Foundation's Research Network on an Aging Society.

The recipient of numerous professional awards and honors, she has been selected as a Guggenheim Fellow, received the Richard Kalish Award for Innovative Research and the Distinguished Career Award from the Gerontological Society of America, as well as Stanford University's Deans Award for Distinguished Teaching. Professor Carstensen received her B.S. from the University of Rochester and her Ph.D. in Clinical Psychology from West Virginia University.

Thomas Rando, MD, PhD, is Associate Professor of Neurology and Neurological Sciences and Deputy Director of the Stanford Center on Longevity. He is also Chief of Neurology and Director of the Geriatric Research, Education, and Clinical Center (GRECC) at the Veterans Affairs Palo Alto Health Care Systems. He is a Founding Director of the Muscular Dystrophy Association clinic at the Stanford University Medical Center. Dr. Rando's research focuses on tissue-specific stem cells in aging and disease, and on pathogenetic mechanisms and gene therapy for muscular dystrophies. His research on aging has demonstrated that it is possible to identify biochemical stimuli that can induce stem cells in old tissues to repair injuries as effectively as in young tissues. and this work has broad implications for the fields of regenerative medicine and stem cell transplantation. Rando is a member of several professional societies including the American Neurological Association. He is a former Paul Beeson Physician Faculty



Scholar in Aging awarded by the American Federation for Aging Research, and he is currently an Ellison Medical Foundation Senior Scholar in Aging. In 2005, he received an NIH Director's Pioneer Award for his ground-breaking research in stem cell biology. He received a B.A. from Harvard College, M.D. from Harvard Medical School and Ph.D in Cell and Developmental Biology from Harvard University.

Senior Staff



Anne L. Friedlander, PhD, is Senior Research Scholar and Director of the Project on Mobility at the Stanford Center on Longevity. Within the SCL, she develops innovative strategies to enhance mobility and function throughout the lifespan and promote collaborative efforts between academic research and industry. Friedlander has broad research experience in the areas of enhancing human function and performance, environmental physiology and using physical activity as a means to reduce risk for disease. At the VA Palo Alto Health Care System, she is the Director of the Exercise Physiology Lab in the Clinical Studies Unit and previously served as the Associate Director for Education of the Geriatric Research Education and Clinical Center. Friedlander is also a Consulting Professor in the Stanford Program in Human Biology where she teaches several classes in topics of

applied physiology and agile aging. As co-director of the Human Performance track within Human Biology, she worked to develop new classes that expand opportunities for students interested in human function, wellness and medicine. Dr. Friedlander received a BA from Wesleyan University, a Master's and Ph.D. in Exercise Physiology from the University of California, Berkeley, and conducted her postdoctoral training in the Division of Endocrinology, Geriatrics and Metabolism at the Stanford University School of Medicine.



Steve Goldband, PhD, is Senior Research Scientist and Director of Private Sector Initiatives of the Stanford Center on Longevity, where he works to create new and innovative collaborations between Stanford researchers and industry to benefit the population at all ages. Goldband has been a technology entrepreneur, worked in various management, marketing and engineering roles, and served on a university faculty. He co-founded smokeClinic, a venture that brought together state of the art behavior therapy developed with colleagues at Columbia University Medical School and Internet technologies to deliver a smoking cessation program as effective as face-to-face counseling that is scalable and low-cost. Goldband was a software engineer and managed teams of developers at IBM, Sun Microsystems, Apple and several start-up companies, particularly in the area of systems

software, developer tools and compiler engineering. Previously Goldband was a member of the Psychology department faculty at University of Western Ontario, where he studied the psychophysiology of stress and predisposition to coronary heart disease. He received a B.A. from Cornell University and a PhD in Psychology from the University at Buffalo.



Economics from UC Berkelev.

Adele Hayutin, PhD, is Senior Research Scholar and Director of SCL's Global Aging Program, which initiates collaborative research and public discourse on the challenges of population aging. During her twenty-year career as a business economist, she has specialized in issues and trends affecting business investment strategy. She currently focuses on the economic and policy implications of global demographic change. She has developed a comparative international perspective that highlights surprising demographic differences across countries and illustrates the unexpected speed of critical demographic changes. Previously, she was chief economist of the Fremont Group (formerly Bechtel Investments), a diversified private investment company based in San Francisco, senior real estate analyst at Salomon Brothers in New York and director of research at RREEF in San Francisco. Dr. Hayutin received

a B.A. from Wellesley College, a Master's in Public Policy from UC Berkeley, and a Ph.D. in



Jane Hickie, JD, is Senior Research Scholar and Director of Public Initiatives at the Stanford Center on Longevity, where she develops innovative strategies for transforming the culture around human aging. Hickie previously led the Government Relations practice at Public Strategies, Inc. and was a partner in the Washington, D.C. law firm of Verner, Lipfert, Bernhard, McPherson and Hand. She served as the Director of the Texas Office of State and Federal Relations and as the Director of Appointments to Boards, Commissions and the Judiciary for the Office of the Governor. With public and private sector issues, as in political campaigns, her skills are devising and managing plans for achieving measurable success. In addition to securing federal funding for major transportation, environmental and scientific initiatives, Hickie developed assessment tools that include a "Public Risk

Assessment", and managed significant applied research projects for corporate and public sector clients. Hickie received a B.A. from Mount Holyoke College and a J.D. from the University of Texas.

Support Staff

Susan Campbell- Assistant to the Deputy Director Jill Chinen- Assistant to the Director Jill Fattor- Research Associate, Mobility Division David Pagano- Webmaster Lauren Smith- Administrative Assistant Sharon Vazquez- Administrative Assistant

External Advisory Council

Katherine August-deWilde is President and Chief Operating Officer of First Republic Bank where she has been an executive since 1985. First Republic, a private bank and wealth management company, is a wholly owned subsidiary of Merrill Lynch Bank and Trust delivering personalized relationship-based service through preferred banking offices in ten major U.S. cities. Prior to joining First Republic, August-deWilde spent six years at the PMI Group as senior vice president and chief financial officer. From 1978 to 1979 she was director of finance for Intel Corporation. Before that, she was a consultant for McKinsey & Company in San Francisco and London. Her volunteer work at Stanford includes her role on the GSB Advisory Council (two terms), the GSB Women's Initiative, GSB admissions interviewer and Campaign roles as a Parents' volunteer and member of the Leading Matters Steering Committee for San Francisco. Additionally, she previously served as a trustee at San Francisco's Town School for Boys and on the board of the Carnegie Foundation for the Advancement of Teaching. She received her MBA from Stanford University in 1975 and her AB from Goucher College in 1969.

Irene Mecchi is an American writer who has written for print, television, live-action film and theatre. Mecchi's feature film writing credits are on Disney's The Lion King, The Hunchback of Notre Dame and Hercules. She is co-author of The Lion King, Broadway, directed by Julie Taymor. The show won six Tony Awards – including Best Musical. It is in its twelfth year on Broadway – with eight productions running in the U.S. and abroad. Mecchi adapted the Broadway musical, Annie, for ABC and is currently developing an animated film for Pixar that will be released in 2011, as well as a television adaptation of Broadway's classic musical, Peter Pan. She has a production company which is acquiring literary material written for young adults in order to produce a slate of films. A native San Franciscan, Mecchi earned a degree in theatre from the University of California at Berkeley and continued her studies at the American Conservatory Theatre in San Francisco.

Thomas E. Moore, III is a Principal at Bernstein Global Wealth Management, with his client relationships expanding to Europe, Asia and the United Kingdom. He specializes in advising wealthy families and individuals, foundations and charitable organizations on investment and financial matters. Mr. Moore joined Bernstein in 1998 with over 15 years of banking and investment experience. From 1988 to 1998, Mr. Moore was with the New York Stock Exchange where as a Managing Director of the NYSE he was responsible for U.S. new business development and strategies as well as managing U.S. listed company relationships. As a member of the Eligibility Review Committee he was charged with reviewing the qualifications of companies and approving their listing on the NYSE. From 1981 to 1988, he was a credit and lending officer with several New York based money center banks, including The Bank of New York and Citibank, completing Citibank's extensive Credit Training Program in 1982. Mr. Moore holds a Bachelor's degree in Economics from Stanford University, graduating in 1981.

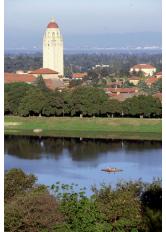
John (Jack) Rowe is Chair of the SCL Advisory Council. Rowe is a Professor in the Department of Health Policy and Management at the Columbia University Mailman School of Public Health. Previously, from 2000 until his retirement in late 2006, Rowe served as Chairman and CEO of Aetna, Inc., one of the nation's leading health care and related benefits organizations. Before his tenure at Aetna, from 1998 to 2000, Rowe served as President and Chief Executive Officer of Mount Sinai NYU Health, one of the nation's largest academic health care organizations. From 1988 to 1998, prior to the Mount Sinai-NYU Health merger, Rowe was President of the Mount Sinai Hospital and the Mount Sinai School of Medicine in New York City. Before joining Mount Sinai, he was a Professor of Medicine and the founding Director of the Division on Aging at the Harvard Medical School, as well as Chief of Gerontology at Boston's Beth Israel Hospital. Currently, Dr. Rowe leads the MacArthur Foundation's Initiative on An Aging Society and chairs the Institute of Medicine's Committee on the Future Health Care Workforce for Older Americans. Rowe was elected a member of the Institute of Medicine of the National Academy of Sciences and a Fellow of the American Academy of Arts and Sciences. In addition, he serves on the Board of Trustees of the Rockefeller Foundation and is a former member of the Medicare Payment Advisory Commission (MedPAC). Dr. Rowe is also Chairman of the Board of Trustees at the University of Connecticut and the Marine Biological Laboratory in Woods Hole. Massachusetts.

George Shultz has had a distinguished career in government, in academia, and in business. He held four different cabinet posts, he taught at three of the country's greatest universities, and he was president of a major engineering and construction company. Mr. Shultz graduated from Princeton University in 1942 with a B.A. in economics and then began his service to the nation as a Marine. He resumed his studies at MIT and earned a PhD in industrial economics in 1949. Early in his career, he served as a senior staff economist on President Eisenhower's Council of Economic Advisors. He taught at MIT and The University of Chicago, where he served as dean of the business school. He resumed public service under President Nixon as Secretary of Labor, Director of the Office of Management and Budget, and Secretary of the Treasury. Mr. Shultz left government service in 1974 to become president and director of the Bechtel Group, Inc. Mr. Shultz held two key positions in President Reagan's administration: Chairman of the President's Economic Policy Advisory Board (1981-1982), and Secretary of State (1982-1989). His many awards include the Medal of Freedom, the nation's highest civilian honor, and the Seoul Peace Prize. He has been a Distinguished Fellow at the Hoover Institution, Stanford University, since 1989.

SCL Faculty Steering Committee

Tom Andriacchi, PhD, is Professor of Biomechanical Engineering. His research focuses on the biomechanics of human locomotion and its biomedical applications to artificial joints, sports injury, osteoarthritis, and neuromuscular disorders.

Bill Damon, PhD, is Director of the Stanford Center on Adolescence and Professor of Education. Damon writes on moral development through the lifespan. Recently he has begun a study on the development of purpose during adolescence. In addition, he is conducting research on how young professionals can learn to do work that is at the same time highly masterful and highly moral.



Alan Garber, PhD, is Director of the Center for Health Policy and the Center for Primary Care and Outcomes Research; Professor of Medicine; Professor, by courtesy, of Economics and of Health Research and Policy. His research focuses on methods for improving healthcare delivery and financing, particularly for the elderly, in settings of limited resources.

Larry Kramer, JD, is Dean of the Stanford University School of Law. His work is directed toward state-state and state-federal conflict of laws, federalism and its history and the role of courts in society.

Iris Litt, PhD, is Professor of Pediatrics. Her research is focused on the health problems of adolescents, including substance abuse, prevention of pregnancy and sexually transmitted diseases, gender differences, compliance with medical regimens and the long-term consequences of eating disorders in young adolescent women.

Duncan Moore, PhD, (external member) is Professor of Optical Engineering and Professor of Biomedical Engineering and Professor of Business Administration at the University of Rochester. He is an expert in gradient-index optics, computer-aided design, and the manufacture of optical systems.

Margaret Neale, PhD, is Professor of Organizations and Dispute Resolution at the Stanford University School of Business. She studies cognitive and social processes that produce departures from effective negotiating behavior.

John Shoven, PhD is Professor of Economics and Director of the Stanford Institute for Economic Policy Research. His research focuses on tax policy, Social Security, and savings patterns.

Faculty Affiliates

Jennifer Aaker, PhD - Professor, Graduate School of Business

Wesley Alles, PhD - Director of the Stanford Health Improvement Program

Hamid Aghajan, MS, PhD - Associate Professor of Electrical Engineering

Thomas Andriacchi, PhD - Professor of Mechanical Engineering, Orthopaedic Research/ Orthopaedics

Steve Artandi, MD, PhD - Assistant Professor of Medicine

Scott Atlas, MD - Professor of Radiology

Jeremy Bailenson, PhD, MS - Assistant Professor of Communication

Albert Bandura, PhD - Professor of Psychology

Clifford Barnett, PhD - Professor of Anthropological Sciences

B. D. Bernheim, PhD - Professor of Economics

Jay Bhattacharya, MD, PhD - Assistant Professor of Medicine

Coit Blacker, PhD - Director & Senior Fellow at Freeman Spogli Institute; Professor in International Studies, School of Humanities and Sciences

Helen Blau, MA, PhD - Professor of Pharmacology, Chemical and Systems Biology

Walter Bortz, MD - University Affiliate

Gordon Bower, PhD - Professor Emeritus of Psychology

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Anne Brunet, PhD - Assistant Professor of Genetics

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Glenn Chertow, MD, PhD - Professor of Medicine

Katrin Chua, MD, PhD - Assistant Professor of Medicine

Karen Cook, PhD - Professor of Sociology and Director of Institute for Research in the Social Sciences

Linda Cork, PhD, DVM - Professor of Comparative Medicine

William Damon, PhD - Professor of Education and of Mechanical Engineering/ Bioengineering

Scott Delp, PhD, MS - Professor of Mechanical Engineering/ Orthopedic Surgery

Carol Dweck, PhD - Professor of Psychology

Karen Eggleston, PhD - Center Fellow, Freeman Spogli Institute

Alain Enthoven, PhD, MA - Professor Emeritus, Graduate School of Business

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B.J.Fogg, PhD - Consulting Professor, Computer Science

Leah Friedman - Senior Research Scholar, Psychiatry and Behavioral Sciences

Lawrence Friedman, JD - Professor of Law and Political Science

James Fries, MD - Professor of Immunology and Rheumatology

Victor Fuchs, PhD, MA - Professor of Economics and of Health Research and Policy, Emeritus

Dolores Gallagher Thompson, PhD - Professor of Psychiatry and Behavioral Science

Alan M. Garber, MD, PhD - Professor of Medicine and Director, CHP/ PCOR

Christopher Gardner, PhD - Associate Professor of Medicine

Rita Ghatak, PhD, MA - Director of Aging Adult Services, School of Medicine

Gary Glover, PhD, MS - Professor of Radiology/ Neurosciences and Biophysics/ Electrical Engineering and Psychology

Garry Gold, MD, MS - Associate Professor of Radiology - Diagnostic Radiology

Jeremy Goldhaber-Fiebert, PhD - Assistant Professor of Medicine

Mary Goldstein, MD, MS - Professor of Medicine

Stuart Goodman MD. PhD - Professor of Medicine

lan Gotlib, PhD - Professor of Psychology, Senior Associate Dean of the Social Sciences in the School of Humanities and Sciences

Hank Greely, JD - Professor of Law and Professor, School of Medicine

Harry Greenberg, MD - Professor of Medicine

Michael Greicus, MD - Instructor, Neurology and Neurological Sciences

James Gross, PhD - Professor of Psychology

William Haskell, MD - Professor of Medicine

Al Hastorf, PhD - Professor of Human Biology and Professor of Psychology, and, by courtesy, in the Graduate School of Business, Emeritus

Cathy Heaney, PhD - Consulting Assistant Professor of Psychology

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Victor Henderson, MD, MS - Professor of Health Research & Policy, Neurology & Neurological Sciences

Andrew Hoffman, MD - Professor of Medicine

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Ting-Ting Huang, PhD - Assistant Professor (Research) of Neurology and Neurological Sciences

Christopher Jacobs, PhD - Associate Professor (Research) of Mechanical Engineering and of Orthopedic Surgery

Susan Johnson, MS, PhD - Assistant Professor of Psychology

James Holland Jones, PhD - Assistant Professor of Anthropology

Laurence Katznelson, MD - Associate Professor of Neurosurgery and of Medicine

Daniel Kessler, JD, PhD - Professor of Law and of Health Research and Policy

Sun Kim, MD, MS - Professor of Endocrinology/ Gerontology/ Metabolism

Abby King, PhD - Professor of Health Research and Policy and of Medicine

Brian Knutson, PhD - Assistant Professor of Psychology and Neuroscience

Larry Kramer - Richard E. Lang Professor of Law, Dean of Stanford Law School

Fredric B. Kraemer, MD - Professor of Endocrinology, Gerontology, and Metabolism

Eswar Krishnan, MD, MPH - Assistant Professor of Medicine

Jon Krosnick, MA, PhD - Professor of Communications and Political Science

John Krumboltz, MA, PhD - Professor of Education and of Psychology

Larry Leifer, PhD - Professor of Mechanical Engineering and Design

Marc Levenston, PhD - Associate Professor of Mechanical Engineering

Iris Litt, MD - Professor of Pediatrics, Emerita, Director, Robert Wood Johnson Clinical Scholars Program

James Lock, MD, PhD - Professor of Psychiatry & Behavioral Science and of Pediatrics

Kate Lorig, MS, PhD - Professor of Medicine

Bingwei Lu, PhD - Assistant Professor of Pathology

Tanya Luhrmann, PhD - Professor of Anthropology

William Maloney, MD - Professor of Medicine

Ellen Markman, PhD - Professor of Psychology

Pamela Matson, PhD - Dean of the School of Earth Sciences, Goldman Professor of Geological and Environmental Sciences; FSI Senior Fellow

Yoshiko Matsumoto, PhD - Associate Professor of Japanese Language and Linguistics

Samuel McClure, PhD - Assistant Professor of Psychology

Debra Meyerson, MS, PhD - Associate Professor of Education and, by courtesy, in the Graduate School of Business

William Mobley, MD, PhD - Professor of Neurology & Neurological Sciences

Duncan Moore, PhD - Professor of Optics, Biomedical Engineering and Business Administration (University of Rochester)

Margaret Neale - John G. McCoy-Banc One Corporation Professor of Organizations and Dispute Resolution

Lorene Nelson, PhD - Associate Professor of Health Research and Policy

Ruth O'Hara, PhD - Assistant Professor of Medicine

Ingram Olkin, MA, PhD - Professor Emeritus, Statistics

Alan Pao, MD - Assistant Professor of Medicine

John Perry, PhD - Professor of Philosophy

Jeffrey Pfeffer, PhD - Professor of Organizational Behavior, Graduate School of Business

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Peter Pompei, MD - Associate Professor of Medicine

Beth Pruitt, MS, PhD - Assistant Professor of Mechanical Engineering

Natalie Rasgon, MD, PhD - Professor of Psychiatry and Behavioral Sciences/ Obstetrics and Gynecology

Gerald Reaven, MD - Endocrinology/ Diabetes/ Geriatric Medicine

Byron Reeves, MA, PhD - Professor of Education

Tony Ricci, PhD - Associate Professor of Otolaryngology

Tom Robinson, MD, MPH - Associate Professor of Pediatrics (General Pediatrics) and of Medicine

William Robinson, MD, PhD - Assistant Professor of Medicine

Jessica Rose, PhD - Professor of Orthopedic Surgery

Lee Ross, PhD - Professor of Psychology

Kenneth Salisbury, PhD - Professor of Computer Science and of Surgery

Richard Saller, PhD - Dean of Humanities and Sciences and Professor of Classics and of History

Juan Santiago, PhD, MS - Professor of Mechanical Engineering

Robert Sapolsky - Professor of Biological Sciences, Neurology & Neurological Sciences, and Neurosurgery

William F. Sharpe, PhD, MA - Professor of Finance, Graduate School of Business

Kathryn Shaw, PhD - Professor of Economics

John B. Shoven, PhD - Professor of Economics, Director of the Stanford Institute for Economic Policy Research (SIEPR)

Robert Lane Smith, MD - Professor, Orthopaedic Surgery, Mechanical Engineering

Samuel So, MD - Professor of Medicine

Claude Steele, MA, PhD - Professor of Psychology

Dolores G. Thompson, PhD - Professor (Research) of Psychiatry and Behavioral Science

Shripad Tuljapurkar, PhD - Professor of Biological Sciences

Anthony Wagner, PhD - Assistant Professor of Psychology

Michael Wald, MA, JD - Professor of Law

Brian Wandell, PhD - Professor of Psychology

Carol Winograd, MD - Professor of Medicine, Emeritus

Terry Winograd, PhD - Professor of Computer Science

Paul Wise, MD, MPH - Professor of Child Health and Society

Tony Wyss-Coray, MS, PhD - Associate Professor of Neurology & Neurological Sciences

Jerome Yesavage, MD - Professor of Psychiatry & Behavioral Science

Paul Yock, MD - Professor of Bioengineering and of Medicine

Stefanos Zenios, MA, PhD - Professor, Graduate School of Business



Within Stanford

SCL Within Stanford

Courses and Teaching

Undergraduate Course on Longevity (Psych 102)



During the Winter quarter 2008, Professors Laura Carstensen and Tom Rando offered a course called "Longevity" for the third time. The course focused on the fact that the status of older people has implications for the functioning of entire societies. Extrapolations for the future based on the status quo are grim. Rates of dementia among the oldest-old -- the fastest-growing segment of the population -- are over thirty percent. The downward shift in the ratio of workers to dependents is threatening the viability of major government programs like Social Security; compounding this problem is the fact that individuals are also saving less money for retirement. And even though health status among the elderly has improved in recent decades, these modest gains may be erased if obesity rates in younger generations continue to rise.

There is now considerable evidence that alternative scenarios are possible if science and cultural change are harnessed for public good. One central finding that applies to biological and social systems is that outcomes of aging are widely variable across individuals. Education, strong social relations, and adequate nutrition and exercise are strongly predictive of positive late-life outcomes. In addition, remarkable new scientific advances are on the horizon. Molecular biologists are developing biochemical interventions that could preserve the mental functioning of older people who are free from disease. "Regenerative medicine" -- a field unheard of five years ago -- is on the brink of developing ways to grow new organs and tissues from a person's own cells. Vaccines for dementia and Alzheimer's disease are being tested in animals. Biomechanical engineers are finding ways to increase bone mass to increase the longevity of our bones. Computer scientists are developing wearable chips that can be embedded in clothing or eyeglasses that will passively read physical movements and compensate accordingly. Smart houses and robots are being designed to assist older people in activities of daily living that currently threaten their autonomy. The Longevity course helped students explore all of these issues.



In the course students also learned about the implications of longer lives for themselves and for societies. All sorts of myths and misconceptions surround the aging process and societal implications are often blurred by political grandstanding. The objective of the course is to provide students with an informed grasp of the conceptual issues, empirical findings and current controversies in the field. There are three central aims of the course. First is to help students to understand why the population is aging from a biological/biomedical perspective and, relatedly, what

we can expect in the coming decades. The course explores issues like whether or not current trends will continue, how long future generations can expect to live and how lifestyles, families and work are likely to change. Second, through the course students gain a more realistic vision of their own futures so they can make more informed life choices and plan accordingly. Third, the course educates future generations of citizens, viz, Stanford students, who will live out their lives in societies where older people outnumber children and who will have a central hand in shaping the consequences of these unprecedented changes.

Agile Aging: An Interdisciplinary Course (CS 379Y/ HUMBIO 131)



In the Winter and Spring Quarters of 2008, Anne Friedlander and her colleagues, Carol Winograd, Terry Winograd and Paul Yock team taught a class designed to develop new strategies and products to enhance mobility in seniors. This two-quarter interdisciplinary sequence was offered by the Hasso Plattner Institute of Design at Stanford in association with the Stanford Center on Longevity. Graduate, undergraduate and medical students from diverse backgrounds were recruited to participate in this unique and innovative class experience. The class brought perspectives from Computer Science, Design, Social and Behavioral Sciences, and Medicine to target innovations to maintain vitality and mobility as people age. The projects found novel ways to integrate computer and device technologies with

behavioral and social interventions.

During the Winter quarter, students learned about relevant background information from experts in the different disciplines, including Computer Science, Physiology, Geriatrics, Psychology, and BioDesign. They also experienced design thinking through smaller "trial voyage" projects that gave them confidence in the design process. The Winter quarter projects focused on needfinding and the formulation of initial design concepts. Selected projects were then developed into a series of prototypes and tests during the Spring quarter.

During the Spring Quarter, small teams did projects that developed their ideas in all dimensions –technical interventions, social and contextual design, organizational contexts, business, and distribution issues. The goal was for students to produce designs that could have an impact in the world – through products, programs, and practices that affect people's health on a broad scale.

In both quarters, a key part of the learning was student group exercises and activities that facilitate understanding the issues of aging as well as the design process. Each class session included a lecture and an activity targeted on these deliverables.

Projects had the general theme of maintaining mobility, but the specific context in which to do needfinding and design may change from year to year. For example, in consecutive years, the class might focus on assisted living facilities, or people being discharged from hospitals, or senior day centers. A summer course-design workshop (August 2007) was planned for associated faculty to identify the target population for the first year and to determine ways to facilitate student access and learning.

Support of Biomedical Engineering Class (ME382)

In Winter Quarter 2008, the SCL sponsored a team of students to design a device that would reduce falls in high risk populations. The students worked on a visual and audio feedback system that could be used to enhance symmetry and control of gait in people at risk for falls. By the end of the class, a working prototype was produced and a seed grant was provided to Dr. Andriacchi's lab to further develop the device.

Exercise Physiology Class, Fall 2007 (HUMBIO 135)

Dr. Friedlander teaches an annual class for undergraduates and graduate students on how the body responds to acute and chronic exercise. The students gain an understanding of physiological and metabolic changes associated with physical activity.

Health Improvement Program

Jill Fattor taught a section of the Science and Dimensions of Wellness class in October 2008 for the Stanford Health Improvement Program available to all employees.



Student Practicum

The Stanford Center on Longevity Practicum is offered to Stanford students each year. Each area of the SCL has different projects where students obtain hands-on experience. For example, the SCL Global Aging Program offers a practicum to students interested in pursuing topics related to economic and political aspects of global aging. The practicum is structured as an internship that involves the student in day-to-day work on SCL projects. Assignments include completing literature searches, compiling articles and documents, writing summaries, and collecting and organizing data. Students work approximately nine hours per week during the 10-week quarter in the practicum, and receive three credits.



Post Doctoral Fellowships



On a competitive basis, the SCL provides financial assistance to fellows in order to advance training of a new generation of longevity researchers. In July 2007, SCL awarded the first three fellowships and in July 2008, three more fellowships were awarded. The candidates are judged on scientific promise based on their history of research productivity and the strength of their recommendations. The proposals are judged on overall scientific merit as well as clarity and persuasiveness. Training potential is judged on the opportunity for strong mentoring and the overall training environment, with a strong emphasis on the interdisciplinary nature of the training and the relevance to the fields of aging or longevity.

2008 Awardees

1. ALICIA CHANG, MD

Department: Medicine & Health Research and Policy

Project: "Addressing the challenge of global population aging: the effect of age on

immune response to T. B. infection"

Primary Mentor: Julie Parsonnet, MD, Medicine & Health Research and Policy

Secondary Mentor: Paul Utz, MD, Associate Professor of Medicine, Center for Clinical

Immunology

Alicia Chang received her MD from UCSF and trained in Internal Medicine at Brigham and Women's Hospital in Boston. She completed her clinical training in Infectious Diseases and the MS degree in Epidemiology at Stanford. Dr. Chang's research under the Stanford Center on Longevity's fellowship is to study the effects of aging and type-2 diabetes on host susceptibility to tuberculosis infection.

2. ADOLFO SANCHEZ-BLANCO, PhD

Department: Developmental Biology **Project:** "A molecular odometer for aging"

Primary Mentor: Stuart Kim, PhD, Developmental Biology **Secondary Mentor:** Art Owen, Professor of Biostatistics

Adolfo Sanchez-Blanco obtained a BS and MS in Biology and Ecology, respectively, from the University of Salamanca in Spain. He completed his PhD in Biochemistry at the University of Connecticut Health Center in 2005. His major area of interest is in the molecular genetics of aging. He is striving to understand the molecular reasons for chronologically and genetically identical animals in a population to age at different rates. To address this question he has developed a molecular odometer for aging in the C.elegans model system. Using this, he has been able to predict the remaining life span of same age individuals in a population while they are still young.

3. MARINA SHKRELI, PhD

Department: Medicine

Project: "Understanding cellular renewal and aging in kidney epithelium"

Primary Mentor: Steve Artandi, MD, PhD, Medicine-Hematology **Secondary Mentor:** Glenn Chertow, MD, Medicine-Nephrology

After completing PhD training in the National Institute of Agricultural Research in France, Marina Shkreli joined the Stanford School of Medicine as a postdoctoral scholar in 2007. Her research is on progressive impairment of kidney function as a hallmark of aging in humans and in rodents. Her work at Stanford led her to hypothesize that podocytes in the kidney possess a previously under-appreciated capacity for renewal during life and that this is important in maintaining a functional filtration barrier during adulthood. The goal of her current work is to determine if and how podocytes renew in adult mice, to identify the pathways involved in this process, and to understand how podocyte renewal is impaired in aging.

2007 Awardees

4. ALESHA CASTILLO, PhD

Department: Mechanical Engineering/Orthopaedic Surgery

Project: "Bone loss with aging with emphasis on mechanics and biology of bone turnover"

Primary Mentor: Christopher R.Jacobs, PhD, Associate Professor

Secondary Mentor: Sanjiv Sam Gambhir, MD, PhD, Professor, Departments of Radiology

and Bio-engineering

Alesha B. Castillo received her PhD in Biomedical Engineering from UC Davis in 2004. Her research is directed at elucidating molecular mechanisms by which mesenchymal stem cells sense and respond to mechanical and biochemical cues to regulate cell fate decisions. As individuals age, bones become less responsive to mechanical stimuli leading to bone loss and increased fracture risk. This may result from preferential differentiation of mesenchymal stem cells down the adipogenic versus osteogenic lineage during aging. The focus of Dr. Castillo's SCL project is to better understand the basis for this lineage switch, knowledge that is key to developing novel therapeutic strategies for the prevention and treatment of osteoporosis and disuse bone loss.

5. CHRISTINA GATHMANN MANEVAL, PhD

Department: Economics

Project: "Data analysis and demographic research (Russia) – the declines in life expectancy – are socialism and the transition to capitalism bad for your health?"

Primary Mentor: Jay Bhattacharya, MD, PhD, School of Medicine

Secondary Mentor: John Pencavel, Levin Professor of Economics, Department of

Economics

Christina Gathmann is an economist who completed her PhD at the University of Chicago in December 2004. Her research focuses on the importance and measurement of human capital and the effects of public policy interventions in the areas of labor markets and health. During her Stanford Center for Longevity fellowship, she has studied the question of whether prohibition actually works. Her project "Determinants of Demographic Change: Gorbachev's Anti-Alcohol Campaign and the Mortality Crisis in Russia" studies the effects of the temperance campaign from 1986 to 1988 on adult mortality. The project will also shed light on the determinants of the "mortality crisis" that reduced male life expectancy by almost a decade in the former Soviet Union in the 1990s.

6. DARIO VALENZANO, PhD

Department: Genetics

Project: "Identifying genes regulating longevity"

Primary Mentor: Anne Brunet, PhD, Assistant

Professor

Secondary Mentor: Russ Fernald, PhD, Professor of

Biological Science

Dario R. Valenzano received his BSc and PhD in Neuroscience from Scuola Normale Superiore, Pisa, Italy. During his graduate work, Dr. Valenzano developed a new model system for the study of aging of the short-lived African killifish Nothobranchius furzeri. He showed that this short-lived vertebrate undergoes a progressive pattern of senescence, and that environmental manipulations, such as diet and temperature, significantly affect Nothobranchius furzeri aging and



lifespan. Dr. Valenzano's current research focuses on mapping the genetic determinants of lifespan in vertebrates, using a quantitative trait loci analysis in two different populations of Nothobranchius furzeri that differ in their lifespan.

Faculty Research

Seed Grants



The SCL received many applications from departments and schools across the University in response to an RFA for seed grant proposals. Among the applications received, 11 were selected to receive a University Research Award of up to \$50,000 for one year. The purpose of a University Research Award is to fund projects that fit within SCL's aim to support research that can help illuminate increased well-being in the population over 50 years old, with a special focus on solutions that improve life at all ages. The studies supported by these awards are expected to lead to future support from external sponsors or have tangible impacts, either in the private sector or the public sector.

Awardees include:

Thomas Andriacchi, Biomotion Laboratory

Project: Developing and testing a device to reduce falling

Steven Artandi, Medicine/Hematology

Project: Restoring fitness and extending lifespan in a mammalian model of aging

Jay Bhattacharya, PCOR

Dena Bravata, PCOR

Project: The longevity and health impact of gardening

Helen Blau, Microbiology and Immunology

Juan Santiago, Mechanical Engineering

Project: Drug delivery micropump for rejuvenation of muscle stem cell function on old mice

Kate Bundorf, Health Research and Policy

Jay Bhattacharya, PCOR

Rui Mata, Dept. of Psychology

Michael Schoenbaum, NIH/Institute of Mental Health

Project: The financial implications of health plan choices: The case of Medicare Part D

prescription drug plans

Chang-Zheng Chen, Microbiology and Immunology

Project: The role of miRNA's in T-cell aging and thymic involution

Michael Grecius, Neurology/Neurological Sciences

Brian Wandell, Dept. of Psychology Robert Dougherty, Dept. of Psychology Project: Cognitive effects of disrupted structural and functional connectivity in the aging brain

Daniel Kessler, GSB/Hoover Institute **David Brady**, GSB **Project**: Health reform in the U.S. from the 1990s to 2009-10



Ruth O'Hara, Psychiatry/Behavioral ScienceNatalie Rasgon, Psychiatry/Behavioral ScienceProject: Sleep apnea and insulin resistance: a role in cognitive decline

Alan Pao, Nephrology
Sun Kim, Endocrinology/Gerontology/Metabolism
Glenn Chertow, Nephrology
Gerald Reaven, Endocrinology/Gerontology/Metabolism
Project: Pathogenesis of accelerated vascular aging: Insulin resistance and chronic kidney disease as model systems

Jessica Rose, Orthopaedic Surgery
Scott Atlas, Radiology
Gary Glover, Radiology
Catherine Chang, Electrical Engineering
Dennis Grahn, Biology
Vinh Cao, Biology
Project: An investigation of physiological mechanisms underlying health benefits of Tai Chi



Mobility Division

Mobility Division











Mission

The Stanford Center on Longevity's Mobility Division seeks to bring together experts who will promote lifelong mobility by preventing or reducing barriers to physical movement. We place special emphasis on the promotion, development and translation of Stanford University expertise and technologies (devices, drugs, biologics, behavior) that encourage or restore physical movement.

Overall Strategy and Focus Areas

Overall Strategy

In late 2007, SCL assembled faculty from a range of departments and schools to identify promising areas of Stanford research that could improve lifelong mobility. Based on individual meetings and larger brainstorming sessions with faculty members, SCL staff and faculty affiliates, we agreed that reducing the barriers to physical movement should provide the central focus for the Division, with an emphasis on the key areas described below - Joint Health, Assistive Technology, Regenerative Medicine and the Built Environment.

Focus Areas

Joint Health

Medical experts estimate that over 45% of adults will develop painful knee osteoarthritis (OA) during their lifetimes, with rates as high as 65% estimated for those who are obese. Osteoarthritis is characterized by a deterioration of cartilage and can result in debilitating pain and loss of function and mobility. The following are the SCL's focused activities in this area:

"Early Detection of Osteoarthritis (OA)" Workshop: The SCL is working with Professor Tom Andriacchi (Bioengineering) to assemble a workshop with an interdisciplinary team of experts who will examine new methods to identify those most at risk of OA in order to encourage early interventions. The workshop, scheduled for January 28-30, 2009, is expected to generate a consensus statement about current knowledge and ideas for grant proposals.

Arthritis Relief Plus (ARP) Clinical Trial: The Mobility Division has initiated a research study with faculty affiliate Dr. Garry Gold (Radiology, Medicine) who has developed a new MRI technique that shows promise in detecting the early signs of osteoarthritis. The study will utilize Dr. Gold's technique, in addition to measures of pain and function, to



test the hypothesis that a new topical cream made from plant extracts can reduce the pain associated with osteoarthritis and potentially slow the progression of the disease by reducing joint inflammation.

Assistive Technology

The Mobility Division identifies and fosters technology that targets specific mobility impairments to enhance physical capacity for individuals. One of these projects includes work with the Stanford robotics program (Professor Ken Salisbury, Depts. of Computer Science and Surgery) on a platform for a home assistive robot. Stanford's Hasso-Plattner Design Institute, (headed by Professor George Kembel, Engineering) also has been involved in this project. The Mobility Division will encourage the development of such robots to assist with mobility impairments. For example, the robot could provide physical support for an individual with compromised balance which would allow the person to walk more, as opposed to less.

Other projects include an innovative design for a shoe to slow the development of osteoarthritis (being developed by Professor Tom Andriacchi (Biomedical Engineering); an affordable prosthetic knee (the Jaipur Knee) being developed collaboratively with the BVMSS Foundation in Jaipur, India and with Professor Andriacchi and Professor Paul Yock (Bio-Design program); and a new device to prevent falls and improve gait for people at risk of falling, also being developed by Dr. Andriacchi.

Regenerative Medicine

On average, strength decreases by approximately 8% per decade after the age of 45. Although the rate of decline can be attenuated with regular physical activity, some degree of sarcopenia (loss of muscle) is an inevitable consequence of aging. Stem cell research may hold the key to maintaining or regenerating muscle cells in the future. The SCL is working with Deputy Director, Tom Rando, MD, PhD, and others at Stanford and beyond to promote this research through the support of targeted conferences and seed grants with a special focus on translation to human applications.

Built Environment

Environmental barriers to movement are pervasive. For example, cars are required to accomplish most tasks outside of the house in suburban neighborhoods; elevators are more prominently located than stairs in most buildings; many jobs involve sitting in front of the computer for hours and even manual labor jobs such as farming are becoming less physical as new mass agriculture equipment is created. Because changing the environment can increase the ease of access to physical activity or even remove the element of



choice, addressing issues within the built environment may provide the most promising means to encourage physical movement. The SCL will work with the Stanford Prevention Research Center and others to make changes in design and planning at the worksite, community, and city level that promote a variety of movement activities.



Mind Division

Mind Division











Mission

The prospect of mental decline associated with aging threatens the wellbeing of individuals and families. The Mind Division of the SCL supports research on early detection of decline, behavioral and biological interventions, and decisions aids aimed at improving cognitive functioning across the life span. The Division also offers the public state-of-the-art information about normal and abnormal aging, along with consensus reviews from the world's experts about potential remedies.

Overall Strategy and Focus Areas

Overall Strategy

Even free from disease, aging is associated with declines in language, speed of processing new information, and certain types of memory, like the ability to hold multiple pieces of information "online" while you solve a problem. On top of normal aging decline, the prospect of Alzheimer's disease and other forms of dementia are counted among the greatest fears of aging people.

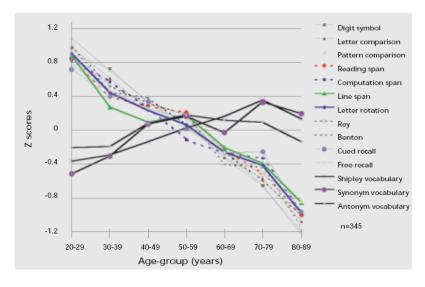
Scientists are making real progress in understanding and modifying cognitive aging. There is certainly reason for hope. Absent clear and easy answers, however, a market is rapidly emerging that preys on fears, with products that promise to reduce cognitive decline and stave off dementia, when there is little or no scientific evidence to support the claims. SCL offers guidance to the public to evaluate products and training programs currently on the market. At the same time, SCL invests in novel research that advances the science of cognitive aging.

The Mind Division is focusing on four major areas: compensation (using preserved skills to compensate for declines), early detection of decline, cognitive fitness, and health related and financial decision making.

Focus Areas

Compensation: Using strengths to compensate for decline

Most attention to cognitive aging focuses on decline. Yet, importantly, there are areas of preserved strength with age and even gains in some aspects of cognitive development. For example, procedural memory how to do things, like driving a car – does not decline with age. Some aspects of self-regulation improve. For example, older people control their emotions better than younger people and are less susceptible to emotional disorders. Some research suggests that when



older people rely on their feelings about options as opposed to trying to remember everything they can about options, their decisions are just as good if not better than younger people's decisions. Knowledge and expertise also increase with age. Some experts believe that an increase in knowledge allows people to function at high levels despite slowing in processing speed. SCL will support systematic investigation of research on compensation. This research promises to identify strategies and tactics that may allow high levels of performance.

Early detection of decline:

Although it is important to support research dealing with the maintenance of cognitive functioning, it is also important to support research investigating ways to detect cognitive decline very early in the disease process when intervention may be most effective. Through the use of brain imaging, Michael Greicius (Neurology) and his colleagues have found evidence that neural hubs in the brain through which signals travel are not as richly connected in patients with mild AD (Alzheimer's disease) compared to those without AD. They suspect that by scanning structural aspects of the brain, researchers may be able to diagnose AD at an early stage.

Analysis of blood is another promising possibility for early detection. Faculty affiliate, Tony Wyss-Corray and his colleagues have been able to diagnose AD years before significant symptoms in patients. Brain degeneration leaves a certain molecular pattern in the blood stream. Dysfunctional processes lead to changes in molecular patterns in blood that may inform specific ways that AD leads to impairment. Thus, early detection may not only allow early diagnosis, it may point to ways that the disease causes damage and point the ways to more targeted interventions.

Cognitive Fitness

Many companies are currently marketing products that claim to enhance cognitive performance and keep the brain fit throughout old age. However, while cognitive scientists remain optimistic about the possibility of the efficacy of such products in the future, existing products and training programs do not tend to transfer abilities to novel tasks or domains. In other words, if a product trains a person to solve logic puzzles, that person will get better at solving logic puzzles but won't see improvement in other areas. Physical exercise, on the other hand, is the one type of task that currently has scientific support for its cognitive benefits. It appears that people's brains may benefit structurally and functionally from regular physical exercise.

However, even when people are armed with knowledge about the benefits of physical exercise, the majority still do not alter their lives accordingly. Therefore, not only is future research needed to more fully understand the mechanisms that underlie the benefits of physical exercise but also to understand how to motivate the large proportion of currently sedentary children and adults to take on more physical activity in their daily lives.

Hormone therapy for neuroprotection:

Scientific advances could lead to protection against disease. One promising area of neuroprotection for postmenopausal women is estrogen hormone therapy (E/HT). Because this is such a promising area of research with profound implications for an aging society, the SCL will be an active participant in bringing together researchers from different disciplines in order to discuss the current obstacles in the field as well as to establish a consensus view for future directions of research.

Research on health-related and financial decision making:

Increasingly, Americans are being asked to play an active role in decision making in their medical care. "Consumer directed" care often demands processing and synthesizing large amounts of complicated information, precisely the types of tasks that challenge aging minds. SCL researchers will address ways to improve decision making in older adults though training strategies and developing effective devices that aid and improve decision quality.



Financial Security Division

Financial Security Division











Mission

Across the same years that life expectancy has increased, individual savings rates in the U.S. have decreased. The SCL is undertaking research on products, technologies, and financial education that will help people better plan and save for their futures. The SCL will pursue research on psychological barriers to long term planning and economic incentives to saving, in order to help people be financially secure throughout life.

Overall Strategy and Focus Areas

Overall Strategy

The Stanford Center on Longevity's Financial Security Division is framing a series of projects that will shed light on the conundrum of longer lives and financial planning: charting financial milestones across life, retirement savings among Americans, and improving financial planning tools.

Focus Areas

Financial Milestones

For several decades, financial milestones have been fairly predictable; marriage, house purchase, children and then retirement. Retirement planning models were developed accordingly. However things have radically changed; we live longer, we marry later or more than once, have children later who then remain dependents longer, we care for aging parents who live longer, we pay for more of our own skyrocketing healthcare costs, we need to plan for long-term healthcare expenses that can last for years and we now depend on personal savings, 401K plans instead of pension plans and social security to fund our retirement. The Financial Milestones Project intends to understand those new milestones, evaluate when people face those events and determine costs and considerations with each milestone. The findings from this project will provide a foundational level of understanding that can be applied to influencing policy decisions as well as practically employed in creating and evaluating planning tools and programs.

Retirement Savings Parameters among Americans

Even when armed with tools, information and support, a large portion of the population ignores the need to prepare for retirement. It's viewed as being complicated, too far away to worry about, or too scary. In addition, an array of assumptions is made about how retirement will be financed. Can adequate retirement savings be defined in an accessible and understandable way for the general public and can it be communicated in a way which resonates with the average consumer? The Financial Security Division will enlist a group of experts



to write an accessible consensus statement that; 1) explains what it means to save adequately for retirement; 2) raises awareness about the need to save and 3) tests the best ways to communicate those findings.

Improving Financial Planning Tools

Many financial planning tools have been created to assess retirement preparedness, but the extent to which these tools have been used and how effective they have been has yet to be determined. The SCL will evaluate the various financial planning products that are currently on the market and using the findings from the Financial Milestones Project, will make specific recommendations to the general public regarding which ones may be most useful and effective in planning for and navigating through retirement. These might prove useful for younger populations as well, including people as young as high school age.



Politics, Scholars and the Public Program

Politics, Scholars, and the Public Program









Mission

In the Politics, Scholars and Public project, the SCL aims to inform policy decisions that impact longevity. The program brings together political experts, scholars and voters in a search for sensible solutions to current societal challenges. The program presumes that an informed public makes reasonable and equitable decisions.

Overall Strategy and Focus Areas

Overall Strategy

The first major initiative of the Politics, Scholars and the Public program is focusing on increasing costs and limitations to access in U.S. health care in the United States. These issues are particularly timely given a new administration and Congress in Washington, D.C.



Focus Areas

Health Security Project: Building Sensible Health Care Solutions (Fall, 2007-Summer, 2009)

The initial results of this project include the following findings:

- There is consensus among experts on the causes of increasing costs of health care and limitations of access to the health care system;
- There is not expert consensus on the best solution to these challenges; and
- There are strongly held partisan differences.

The Health Security project involved a series of face-to-face intensive dialogues among University, political and policy experts to better define the challenges in the health care system, understand areas of disagreement and eliminate ineffective options. These dialogues occurred with the following steps:

- Academic and political experts established potential policy options aimed at improving access and cost;
- A framework was created for dialogue with the public that emphasized transparency about the trade-offs involved with each of the policy options;



- Feedback from Washington-based policy and political experts was considered;
- Discussion groups were held with voters including small business owners; and
- An online survey will be conducted among 2,000 registered voters to determine core attitudes toward the health care system, and reaction to six detailed policy proposals including:

<u>Containing costs</u>: changing incentives for doctors and hospitals, changing incentives for patients, an independent health board for cost/benefit information

<u>Expanding access</u>: expansion of existing government programs, national insurance with required participation, universal health vouchers

In the SCL's 2008-09 report, we will present results from the Health Security project, together with our evaluation of the program's impact and reach.



Global Aging Program

Global Aging Program











Mission

The Global Aging Program at the SCL focuses on economic and political implications of shifts in population aging. There is a shift towards older age brackets in almost every country as people live longer and have fewer children. Although population aging is a global phenomenon, large variations in the timing and pace of fertility declines and longevity gains create dramatic differences across countries. Because these demographic developments and their divergent patterns have significant implications for economic growth and political stability, understanding how they are likely to unfold is critical for addressing them wisely.



Overall Strategy and Focus Areas

Overall Strategy

The Global Aging Program's goals are to initiate collaborative research and to stimulate public discourse, and eventual action, on the challenges and opportunities associated with population aging, particularly those associated with global economics, US national security, and social well-being. The program sees the phenomenon of "global aging" as one of four global forces, along with globalization, technological innovation, and global climate change, all of which are shaping our world.

Focus Areas

Stimulating Public Discourse

Communications Strategy

To ensure that the Gloabal Aging program is able to maximize its impact, we made a significant investment in 2007-2008 in developing a comprehensive communications strategy. We assembled a team of communications and political consultants to provide expertise in messaging as well as insight on and access to the policy makers and thought leaders who are the primary audience for the program's work. The assembled team laid out an 18 month strategic communications plan, including an articulation of the goals, target audiences, competitive analysis, branding and messaging, key communication activities and tools, and calendar of activities. A major component of this plan has been to schedule meetings for Program Director Adele Hayutin with elected officials and senior members of the new Obama administration.

Aging Asia Conference

In collaboration with the Walter P. Shorenstein Asia Pacific Research Center (APARC), the Global Aging program began planning for a two day conference; Aging Asia: Economic and Social Implications of Rapid Demographic Change in China, Japan, and Korea, to be held on February 26 and 27, 2009. The goal is to develop a broader understanding of how population aging could affect the social, cultural, economic, and security futures of Asia over the next ten to twenty years. Invited guests will include leaders from business, government, and academia.

Cross-National Research

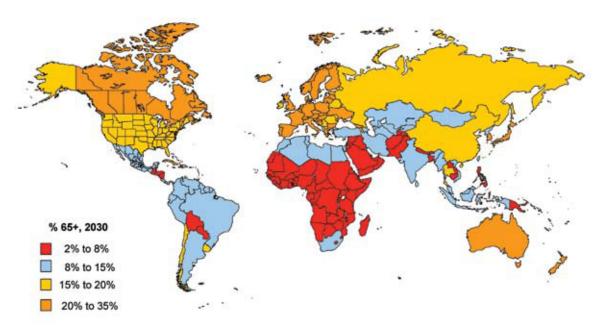
Index of Elderly Well-Being

SCL has contracted with the Population Reference Bureau (PRB) to develop an Elderly Well-Being Index. The index will serve as a valuable tool for monitoring the well-being of the elderly across key dimensions and for comparing their well-being within and across countries, and eventually over time. For example, within a country, the index will enable researchers to answer how elderly men and women compare in their overall well-being. Cross national comparisons also will be possible.

Initially this index and underlying indicators and sub-indices will facilitate comparison across nineteen countries for which data are currently available, with other countries added as data become available. The methodology for the index will be designed by PRB, with extensive input from an interdisciplinary advisory committee which will provide both expertise in index creation and an important "user perspective." The index, sub-indices, and indicators will be released in downloadable spreadsheets complete with technical documentation. Data allowing within country and sub-population comparisons will be made available wherever such data exist. Making this wealth of information available to scholars and the public through both the PRB and SCL websites will be an important part of encouraging further research on topics related to longevity and global aging. In addition to creation of this database, other important outputs of the project include factsheets, various reports, a policy seminar, an article in a peer-reviewed journal, and presentation to a professional policy audience.

Comprehensive Data Base of Global Demographic and Economic Data

The Global Aging Program continues to work with Stanford's Institute for Research in the Social Sciences (IRiSS) to develop a comprehensive database that will integrate demographic and economic data from multiple sources and that will be easily accessible for academic researchers and policy analysts. The vision is for the extensive UN data, as well as other international data sources, to be easily downloadable and able to be manipulated for quick analysis on the SCL website, further reinforcing the Global Aging Program as a go-to source for information on population age shifts, their implications, and the importance of understanding them.





Outreach

Outreach

The SCL engages in many and varied outreach activities, both on the Stanford campus and in the world. Outreach falls into the following areas which are highlighted below: publications; the SCL website; SCL conferences; speaking engagements and meetings; SCL collaborations and events.

SCL in the News

Features

"Rethinking Old Age," by Dorothy Pomerantz, Forbes Magazine, November 26, 2007

"The Older-and-Wiser Hypothesis,"
Stephen S. Hall, New York Times Magazine, May 6, 2007

"Special Report- The Long of It: The Globe Turns Gray"
Stanford Medicine Magazine, Spring 2008

"Getting Older and Getting Better," by Patricia B. Gray, Money Magazine, February 7, 2008

"Emotionally, the Best May Be Yet To Come,"
Shari Roan, Los Angeles Times, October 15, 2007



Global Aging Program Reports

"Challenges and Opportunities of Global Aging," Briefing Materials for SCL Working Session, May 15, 2008

"Graying of the Global Population," Public Policy & Aging Report, No. 4: 12-17, Vol 17, January 2008

"Global Demographic Shifts Create Challenges and Opportunities." Pension Real Estate Association Quarterly, Fall 2007

"Global Aging: The New New Thing: The Big Picture of Population Change," Issued by SCL, November 2007

"How Population Aging Differs Across Countries: A Briefing on Global Demographics," Issued by SCL, March 2007

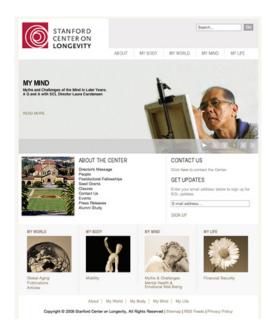
Mobility Division

"Texting to Increase Physical Activity", for the Texting4Health book (edited by BJ Fogg and R. Adler of the Stanford Mobile Persuasion Lab). In press (due out in winter 2009)

SCL Website

In 2008, the SCL invested significant time and resources in the design and development of a website that is compelling in its content, highly interactive, and visually appealing to the user.

The quality of the content the site contains is key. With well over 120 faculty affiliates, there are many possible topics to be addressed. SCL has hired science writers to ensure that the articles posted on faculty affiliate research and the latest advancements in longevity research are as compelling and informative to the academic expert as they are to the lay reader. A section of the home page has been dedicated to a Flash feature to highlight the most recently added content.



SCL Conferences

"Challenges and Opportunities of Global Aging" - May 2008

In May 2008 former Secretary of State George Shultz and SCL convened an interdisciplinary conference of Stanford experts to discuss the "Challenges and Opportunities of Global Aging." The purpose of the conference was to explore how global aging will affect US interests in such areas as economics, health, national security, and education, and to identify the challenges, opportunities, and implications of global aging that are most important for consideration by the next US President. The conference brought together colleagues from across Stanford to explore the emerging uncertainties and lend their expertise as they thought about how best to prepare for the future.

"Cognitive Aging" - April 2008

Experts in the field of cognitive aging met at Stanford in April of 2008 to dicuse the best ways to keep minds sharp into advanced years. This interdisciplinary conference was co-sponsored by the Center on Longevity and the Max Planck Institute for Human Development in Berlin, Germany. Experts in disciplines ranging from psychology to neuroscience to education gathered at the conference to discuss the latest research findings about "brain training" and prospects for improving normal cognitive functioning with age. Scientists have found that regular aerobic activity increases blood flow to the brain and helps grow new



neural connections and perhaps even brain cells. Physical exertion controls hypertension and other cardiovascular risks, which in turn appears to prevent or slow cognitive decline. The commercial software products so much in the news train users on specific tasks such as memorizing lists of words. And they work, for developing that particular skill, but generalization of trained skills to everyday actions has been less effective, and doesn't necessarily translate to sharpening memory in general. In addition, there is no evidence that these programs cure or prevent Alzheimer's and other brain diseases.

"Texting4Health Conference"- February 2008

In February of 2008, the SCL cosponsored a Texting4Health conference with the Stanford Mobile Persuasion Lab, the CDC, the American Heart Association, and the Institute of the Future. The conference showcased current applications and new ideas about using mobile text messaging (SMS) to improve personal and public health. In addition to financial support by the SCL, Anne Friedlander served on the program committee and chaired a session on the role of texting to increase physical activity. The conference was attended by hundreds of local public health officials, technology business people, scholars, and students. A book based on the conference topics is being published in which Jill Fattor and Anne Friedlander have coauthored a chapter on texting to increase physical activity.

Highlights of Speaking engagements, briefings and invitations to meetings:



SCL Co-Sponsorship of Event with Sandra Day O'Connor

The first annual Rathbun Visiting Fellow, the Hon. Sandra Day O'Connor '50, LLB '52, joined Laura Carstensen to speak to students on citizenship and lifelong public service in an intimate setting, exploring wide-ranging issues including discrimination, the psychology of public service and constitutional law. Students attended from the Graduate School of Business, Law School, and the Haas Center for Public Service.

FY 2007-2008

The senior staff of the SCL participated in many and varied speaking engagements. Below are selected highlights from 2007-2008.

Laura Carstensen

Invited speaker at NIH's Cognitive Aging Summit in Washington, DC.- "How Do Psychosocial, Cultural, and Environmental Factors Shape Cognitive Aging?" - October 2007

Gave the Reimer-Lüst-Lecture at the MPI, Berlin - "The Influence of Shifting Temporal Horizons on Human Aging" - November 2007

Invited speaker at the "Bring the Family" plenary address at the Association of Psychological Science annual meeting, Chicago, IL, "Long Life in the 21st Century"- May 2008

Invited speaker at the Presidents' Circle of the National Academies of Sciences meeting in Washington, DC.

Thomas Rando

Delivered the annual F. L. McNaughton Lecture at the Montreal Neurologic Institute, Montreal, Canada - December 2007

Delivered opening lecture at the Telomerase and Cancer Stem Cells symposium, sponsored by the British Association for Cancer Research - Cambridge, MA - June 2008

Adele Hayutin

Invited speaker at UC Berkeley Fisher Center for Real Estate and Urban Economics, Policy Advisory Board Meeting. Berkeley, CA- Gray Areas: How Global Aging Affects Real Estate Opportunities" - October 2007

Invited speaker at the Gerontological Society of America Annual Meeting, San Francisco, CA- "Asia's Age Waves: A Comparative Demographic Overview" - November 2007

Invited speaker at Council on Foreign Relations, Roundtable Series on Anticipating European Futures. New York, NY-"Shrinking Workforces and Other Demographic Challenges" – April 2008

Anne Friedlander

Invited speaker at Exercise and the Brain Symposium sponsored by the Davis Phinney Foundation as part of the Amgen Tour of California, Palo Alto, CA - "Physical Activity: The Ultimate Anti-Aging Pill" – February 2008



Faculty Involvement

Professor Tom Andriacchi received an SCL seed grant to develop a device designed to reduce the risk of falling. One of the often overlooked risk factors for falling is gait dissymmetry. Andriacchi is creating an integrated wireless system designed to train individuals to walk symmetrically. Using a combination of sensing platforms placed in the user's shoe and a visual and auditory feedback system, the device incrementally decreases the magnitude of gait asymmetry.

SCL Collaborations, Projects and Events

The SCL is a member of the MacArthur Foundation Aging Society Network, a new interdisciplinary research network to help America prepare for the challenges and opportunities posed by our aging society.

The work of the Global Aging Program is in use in international arenas, thanks in part to a continuing relationship between Adele Hayutin and former Secretary of State George Shultz, as well as with the Population Reference Bureau.



In July of 2007 Hayutin prepared briefing materials for Mr. Shultz on Russian's aging and shrinking population, declining fertility and life expectancy, and the serious consequences of such demographic trends. Mr. Shultz used the briefing in his meetings with Russian officials and distributed numerous copies of the briefing and other SCL reports. In the fall of 2008, Mr. Shultz again broadcast the work of the Global Aging Program by distributing a comparative briefing on China's demographic outlook to the JP Morgan Chase International Council, during his panel discussion with other council members including former Secretary of State Henry Kissinger and former UK Prime Minister Tony Blair. The document highlighted implications of changes to China's population and the aging of its workforce.

In addition, the SCL co-sponsored the following events in 2007- 2008:

September 2007

SCL co-sponsored the "8th Annual Age Boom Academy" (at the International Longevity Center). The theme of the conference was "Science in Society"- New York, NY

October 2007

SCL co-sponsored (with the Stanford Drama Department), an arts event featuring Anna Halprin at the Cantor Arts Center. The title of the event was "Dancing with the Rodins: Awaken". This was an environmental work created by Halprin (87 years old) and her dancers from the Sea Ranch Collective. The dance was designed specifically for the Rodin Sculpture Garden and outside environs of the Cantor Arts Center.

November 2007

SCL was a co-sponsor at the Gerontological Society of America (GSA) Annual Conference and hosted a booth. San Francisco, CA

January 2008

SCL hosted Jane Fonda at the SCL, shared SCL's research on aging, and engaged in conversations about how older people are conveyed in the media and particularly in the entertainment industry. Stanford, CA

February 2008

SCL hosted a booth at the Amgen Tour of California. Palo Alto, CA

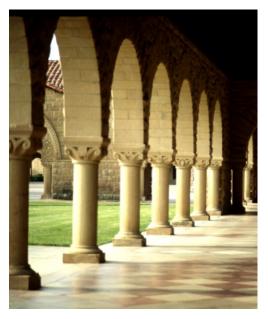
April 2008

SCL co-hosted (with Stanford's Office for Religious Life) a panel discussion on personal health and well-being, featuring Justice Sandra Day O'Connor, Coach Tara VanDerveer, and Laura Carstensen. Stanford, CA



Conclusion and Look-Ahead

Conclusion and Look-Ahead



In the SCL's third year, we will continue to refine and develop the strategies identified in year two within the Center's divisions and programs. Conferences, policy reports and strategic planning will continue to build on our accomplishments. The SCL's educational programs (courses, seed grants, postdoctoral fellowships) will educate future leaders and researchers who will make changing the culture of aging a reality.

The SCL's next annual report will more fully cover the Center's Health Security Project, Aging Asia and Osteoarthritis conferences, and other programs currently in planning.

For more information about the Stanford Center on Longevity, please contact:

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