Children's Hospital LOS ANGELES®
THE SABAN RESEARCH INSTITUTE

USC University of Southern California

The Saban Research Institute Annual Symposium

BIG DATA – BIG IMPACT

Feb. 12, 2019

WELCOME

Medicine is an information profession. Children's Hospital Los Angeles collects vast quantities of it on a daily basis, regarding patient visits, imaging, labs, demographics, billing, medication use and health outcomes. Similarly, our research enterprise—including basic, translational and clinical efforts—generates petabytes of data each year that is subsequently collected, analyzed and stored.

Learning from such massive amounts of complex data has become routine for commercial enterprises like Google and Facebook, and government organizations such as the National Security Administration. The techniques, also widely used in biomedical research, employ computer programs to uncover patterns and relationships that might not otherwise be apparent. Information on this scale has been termed "big data" and is defined by its volume, variety and velocity.

Big data in medicine holds the promise of becoming an engine to address unmet needs of patients, clinicians, researchers and policymakers. Novel approaches that leverage these massive data assets could lead to an explosion of discoveries that has the potential to truly transform medicine and the care of children.

Together with our academic partner, USC, we have assembled a group of investigators who are using big data to alter the trajectory of discovery and advance efforts to improve patients' lives. Harnessing the strategies and applications discussed today will require new ideas, new training, new techniques and new collaborations. We thank you for joining a diverse group of brilliant individuals who wish to undertake this process.

For their guidance in planning today's symposium, we would like to thank David Cobrinik, MD, PhD, Michele Kipke, PhD, and Paul Thompson, PhD. We would also like to acknowledge our impressive team members and partners for their efforts in creating this important event.

We extend our gratitude to the philanthropists—those with us today as well as those who were unable to attend—who support research. Thank you for your vision and commitment. We would especially like to acknowledge Cheryl and Haim Saban and The Saban Family Foundation for their ongoing support.

Warmest regards,

Paul S. Viviano
President and Chief Executive Officer
Children's Hospital Los Angeles

Pat Levitt, PhD
Vice President and Chief Scientific Officer
Children's Hospital Los Angeles

SYMPOSIUM OVERVIEW
Big Data – Big Impact

The latest revolution in science is the remarkable capacity that we now have to collect and analyze data at breakneck speed and at levels that were unforeseen just a few years ago. Data science has developed new terms, such as yottabytes, to describe the mind-boggling amount of information gathering in real time. Big data has taken center stage in medicine and biomedical research. The hope is that it will have big impact on our ability to identify information that will change the way we discover mechanisms of disease through basic and translational research, as well as how we develop the most effective strategies to treat pediatric illness and improve the lives of children and their families through clinical research.

Today's symposium, "Big Data – Big Impact," brings to Children's Hospital Los Angeles national leaders in harnessing the use of data gathered from the laboratory to the community, joined by our own science innovators at CHLA and partner institution USC. Discussion of how to best harness big biomedical and clinical data for application, and the opportunities to grow collaboration here and across institutions, will grab the interests of our diverse community of biomedical researchers, informaticists and clinicians.

Symposium Co-Organizer:
David Cobrinik, MD, PhD

David Cobrinik, MD, PhD, is Associate Professor of Research Ophthalmology and Biochemistry and Molecular Medicine at the USC Keck School of Medicine, and a member of The Vision Center and the Developmental Neuroscience and Cancer Research programs of The Saban Research Institute of Children's Hospital Los Angeles. Originally from Boonton, New Jersey, Dr. Cobrinik graduated magna cum laude from Amherst College in 1982 with a major in biology, and then attended Case Western Reserve University, where he completed a medical degree and a doctorate in biochemistry in 1989. He pursued postdoctoral studies with Robert A. Weinberg at the Whitehead Institute for Biomedical Research, where his research focused on cell cycle and developmental functions of retinoblastoma (RB)-related proteins. He continued retinoblastoma-related research at Columbia University College of Physicians and Surgeons (1995-2003), Weill Cornell Medical College (2003-2008), and Memorial Sloan-Kettering Cancer Center (2008-2012) prior to being recruited to USC and Children's Hospital Los Angeles. The Cobrinik lab aims to understand how normal retinal development goes awry during formation of retinoblastoma tumors as a means of improving retinoblastoma treatment and prevention. As an important step toward this goal the lab identified cone precursors as the retinoblastoma cell-of-origin and discovered that human-cone-precursor-specific circuitry collaborates with RB loss to enable tumorigenesis.

Symposium Co-Organizer:
Michele Kipke, PhD

Michele Kipke, PhD, is a Professor of Pediatrics and Preventative Medicine at the Keck School of Medicine of USC, and serves as the Vice Chair of Research within the Department of Pediatrics at Children's Hospital Los Angeles. She is also Co-Director of the Southern California Clinical and Translational Science Institute (SC CTSI) at USC, overseeing Clinical Research at CHLA. A nationally known pediatric health researcher and policy expert, Dr. Kipke has been intimately involved in the HIV/AIDS epidemic since its onset in the U.S. and has made significant scientific contributions to the field of HIV prevention. Early in her career, she studied risk for HIV exposure among homeless youth and injection drug users, developed and conducted the first formal evaluation of an HIV prevention intervention for adolescents in Harlem, and evaluated one of the first needle-exchange programs. Dr. Kipke's current research is focused on bio-behavioral risk factors and outcomes, including intensive longitudinal data using sensors to study risk among drug-using and young men of color, and research to improve the care delivered to children with neurodevelopmental disorders.

Symposium Co-Organizer:
Paul M. Thompson, PhD

Paul Thompson, PhD, directs the ENIGMA Center for Worldwide Medicine, Imaging & Genomics, a U.S. National Center of Excellence for "big data" analysis in biomedical research. In 2009, Dr. Thompson co-founded—and now leads—the ENIGMA consortium (enigma.usc.edu), a worldwide medical network of 340 institutions across 40 countries studying the major diseases of the brain. ENIGMA has published the largest neuroimaging studies of eight major brain disorders—including schizophrenia, bipolar disorder, major depression, epilepsy, ADHD, PTSD and OCD—and also leads international studies of Alzheimer's disease, Parkinson's disease, anorexia, substance use and anxiety disorders. In ENIGMA's series of papers in Nature, Nature Neuroscience and Nature Communications, 340 institutions pooled their DNA and MRI data to identify over 100 genomic loci that influence brain structure and disease risk using massively parallel distributed "big data" computing (Medland Nature Neuroscience 2015). ENIGMA discovers factors that affect the onset and progression of Alzheimer's disease and other dementias; schizophrenia; depression and bipolar illness; HIV/AIDS; substance abuse; autism; and childhood brain disorders. Dr. Thompson's group also created the first MRI maps of Alzheimer's disease and schizophrenia spreading in the living brain, and a method of detecting brain growth in children (published in the journal Nature). Dr. Thompson also directs the USC Imaging Genetics Center and is Associate Director of the Stevens Institute for Neuroimaging and Informatics. At USC, he is a Professor of Neurology, Psychiatry, Radiology, Pediatrics, Engineering and Ophthalmology. Dr. Thompson obtained his master's in mathematics and classical languages from Oxford University in England, and his doctorate in neuroscience from the University of California, Los Angeles. His team of 30 researchers includes students in neuroscience, genomics, biomedical engineering and biomedical physics. Collaborating with over 300 imaging labs around the world, Dr. Thompson's 1,600 research publications (h-index=150) combine the talents of researchers in neuroimaging, mathematics and clinical neurology (see igc.ini.usc.edu).

SCHEDULE

8 – 8:45 a.m.
Continental Breakfast and Check-in
The Saban Research Building lobby

8:45 – 9 a.m.
Symposium Welcome
Pat Levitt, PhD, The Saban Research Institute of Children's
Hospital Los Angeles; Keck School of Medicine of USC

Paul S. Viviano, President and Chief Executive Officer,
Children's Hospital Los Angeles

SESSION 1
9 – 9:50 a.m.
Pediatric Translational Research Using Clinically
Generated Data
Sara L. Van Driest, MD, PhD, Vanderbilt University

9:50 – 10:40 a.m.
A Cellular and Molecular Paradigm for Understanding
Human Brain Function and Specialized Properties
Ed Lein, PhD, Allen Institute for Brain Science; University of
Washington

10:40 – 11 a.m.
Morning Break

SESSION 2
11 – 11:20 a.m.
Single-Cell Profiling of the Transcriptomic Response to RB
Loss in the Retinoblastoma Cell of Origin
Sunhye Lee, PhD, The Saban Research Institute of CHLA

11:20 a.m. – 12:10 p.m.
Pediatric Cancer Precision Medicine: The Impact of Big Data
Elaine R. Mardis, PhD, The Ohio State University

12:10 – 12:30 p.m.
Population and Tumor Heterogeneity in Cancer
Genome Science
John D. Carpten, PhD, Keck School of Medicine of USC

12:30 – 1:30 p.m.
Lunch
Anita S. Watson Courtyard of The Saban Research Building

SESSION 3
1:30 – 2:20 p.m.
Accelerating Movement Science With Big Data
Scott L. Delp, PhD, Stanford University

2:20 – 2:40 p.m.
Big Data in the Era of Lifecare
Leslie A. Saxon, MD, Keck School of Medicine of USC

2:40 – 3 p.m.
Human-Robot Interaction for Data-Driven Personalized Care
Maja J. Matarić, PhD, USC Viterbi School of Engineering

3 – 3:20 p.m.
Afternoon Break

3:20 – 3:40 p.m.
Clinical and Research Informatics at CHLA: Current State
and Next Steps
Juan Espinoza, MD, The Saban Research Institute of CHLA;
Keck School of Medicine of USC

3:40 – 4 p.m.
Places, Social Determinants of Health, and Electronic
Health Records
John P. Wilson, PhD, USC Dornsife College of Letters, Arts
and Sciences

4 – 4:15 p.m.
Panel Discussion: Big Data—Big Impact in the Next 10 Years

4:15 – 4:20 p.m.
Closing Remarks
Randolph W. Hall, PhD, Vice President of Research;
Daniel J. Epstein Department of Industrial and Systems
Engineering, USC

4:20 - 5 p.m.
Reception
Anita S. Watson Courtyard of The Saban Research Building

Pat Levitt, PhD

Pat Levitt, PhD, is the Vice President, Chief Scientific Officer and Director of The Saban Research Institute of Children's Hospital Los Angeles. He is the Simms/Mann Chair in Developmental Neurogenetics at CHLA, and W.M. Keck Provost Professor of Neurogenetics at the Keck School of Medicine of USC. He received his bachelor's degree in biological sciences from the University of Chicago and his doctorate in neuroscience at the University of California, San Diego, and he completed a postdoctoral fellowship at Yale University. Dr. Levitt has held leadership positions at the University of Pittsburgh, Vanderbilt University and USC. Dr. Levitt has served as a member of the U.S. National Advisory Mental Health Council for the National Institute of Mental Health, and as an elected member of the National Academy of Medicine. He is a senior fellow at the Center for the Developing Child at Harvard University, and serves as Co-Scientific Director of the National Scientific Council on the Developing Child, a policy council that assists policymakers, service providers and business leaders in making wise decisions regarding child program investments. Dr. Levitt has spoken to these groups in 42 states.

Dr. Levitt's laboratory does both basic and clinical research. The program focuses on identifying the factors that ensure healthy development of brain architecture that controls learning and emotional and social behavior. His clinical research studies address how toxic-stress responses in infants and toddlers may be detected as early as possible for promoting resilience and better prevention and intervention development. Studies of children with autism examine the impact of having co-occurring medical conditions, such as gastrointestinal disorders, and how medical treatment can improve quality of life and behavior. Dr. Levitt has published over 290 scientific papers.

Paul S. Viviano

Paul S. Viviano is a health care leader who has directed academic, nonprofit and for-profit health care organizations that deliver excellence in clinical care, research and diagnostics for three decades. Viviano joined Children's Hospital Los Angeles as President and Chief Executive Officer in 2015 and serves as a member of the institution's Board of Trustees.

Previous to serving as President and Chief Executive Officer of CHLA, Viviano served as the CEO and Associate Vice Chancellor for the UC San Diego Health System, an institution noted for its leadership in medical research and patient care. He has also served as the President and Chief Executive Officer of Keck Hospital of USC and USC/Norris Cancer Hospital and held various chief executive roles within the St. Joseph Health System, ultimately serving as the President and Chief Operating Officer for the system. He served as Chairman of the Board and CEO of Alliance HealthCare Services, the nation's largest provider of outpatient diagnostic imaging services and radiation oncology services, for 10 years.

Viviano currently serves on the boards of several organizations, including as Chair of the California Children's Hospital Association. He is also a member of the Public Policy Committee for the national Children's Hospital Association and Chair of the Board of Trustees for Loyola Marymount University. He also is a board member for Alliance HealthCare Services.

Sara L. Van Driest, MD, PhD

Sara Van Driest, MD, PhD, is an Assistant Professor of Pediatrics (Division of General Pediatrics) and Medicine (Division of Clinical Pharmacology) at Vanderbilt University Medical Center. She completed her medical degree and doctorate at the Mayo Clinic College of Medicine followed by a pediatric residency and clinical pharmacology fellowship at Vanderbilt. As a physician-scientist, Dr. Van Driest uses clinically generated data and specimens for research and as a tool for implementation of pediatric personalized medicine. She is focused on improving the dosing and understanding the effects of commonly used medications, including antibiotics, analgesics and sedatives. Her active research projects include searching for pharmacogenomic signals in pediatric patients, developing methods to identify latent drug effects using electronic health records data, and studying fentanyl pharmacokinetics and pharmacodynamics. Her research program has been funded by an NIH KL2, an early career award from the PhRMA Foundation, an Innovation in Regulatory Science Award from the Burroughs Wellcome Fund, and a Doris Duke Clinical Scientist Development Award. Dr. Van Driest is a member of the Society for Pediatric Research and serves on the Scientific Advisory Board for PharVar, a central repository for pharmacogenomic variation. She is the 2019 recipient of the Leon I. Goldberg Early Investigator Award from the American Society for Clinical Pharmacology and Therapeutics.

Ed Lein, PhD

Ed Lein, PhD, is an investigator at the Allen Institute for Brain Science and an Affiliate Professor in the Department of Neurological Surgery at the University of Washington. He received a Bachelor of Science in biochemistry from Purdue University and a doctorate in neurobiology from University of California, Berkeley, and performed postdoctoral work at the Salk Institute for Biological Studies. He joined the Allen Institute in 2004 and has provided scientific guidance for the creation of large-scale gene-expression atlases of the adult and developing mammalian brain as catalytic community resources, including the inaugural Allen Mouse Brain Atlas and a range of developmental and adult human and nonhuman primate brain atlases. Particular interests of Dr. Lein's include using the transcriptome as a core phenotype to understand brain organization at the regional, cellular and functional levels; to understand what is unique about the human brain; and to understand what is disrupted in brain diseases. He now leads the Human Cell Types program, which aims to create a comprehensive understanding of human cortical cell types and circuits using quantitative, single-cell transcriptomic, anatomical and functional methods. Dr. Lein is also an Affiliate Professor in the Department of Neurological Surgery at the University of Washington.

Sunhye Lee, PhD

Sunhye Lee, PhD, is a postdoctoral fellow in Dr. David Cobrinik's laboratory in The Vision Center at Children's Hospital Los Angeles. Dr. Lee received her undergraduate degree in molecular biology and a doctorate in cancer biology from Pusan National University in South Korea, where her studies focused on crosstalk between mutant K-Ras and p53 signaling in pancreatic cancer. Based on her findings, she received a U.S. patent for a method of screening for therapeutic agents for K-Ras mutant-driven cancers. She subsequently performed postdoctoral work at MD Anderson Cancer Center in Houston, studying molecular mechanisms controlling cancer cell stemness. Dr. Lee joined Dr. Cobrinik's lab in 2015 in order to further understanding of and therapeutic approaches to pediatric cancers, in particular a pediatric eye cancer called retinoblastoma. She is currently supported by an Alex's Lemonade Stand Foundation Young Investigator Grant, and her research employs single-cell RNA sequencing to define the gene-expression changes that convert a normal cell into a tumor cell.

Elaine R. Mardis, PhD

Elaine Mardis, PhD, is co-Executive Director of the Institute for Genomic Medicine at Nationwide Children's Hospital and the Nationwide Foundation Endowed Chair of Genomic Medicine. She also is Professor of Pediatrics at The Ohio State University College of Medicine. Dr. Mardis joined Nationwide Children's Hospital in 2016.

Educated at the University of Oklahoma, where she completed a Bachelor of Science in zoology and a doctorate in chemistry and biochemistry, Dr. Mardis did postgraduate work in industry at BioRad Laboratories. She was a member of the faculty of the Washington University School of Medicine from 1993-2016. Dr. Mardis has authored over 350 articles in prestigious peer-reviewed journals and has written book chapters for several medical textbooks. She serves as an associate editor for three peer-reviewed journals (Disease Models and Mechanisms, Molecular Cancer Research, and Annals of Oncology) and is Editor-in-Chief of Molecular Case Studies, published by Cold Spring Harbor Press. Dr. Mardis has given lectures at scientific meetings worldwide, and was awarded the Morton K. Schwartz award from the American Association for Clinical Chemistry in 2016. Since 2013, Thompson Reuters has listed her as one of the most highly cited researchers in the world. Dr. Mardis has been a member of the American Association for Cancer Research (AACR) since 2007, was the Program Committee Chair for the 2018 AACR Annual Meeting, and is the AACR President-elect.

John D. Carpten, PhD

John Carpten, PhD, currently serves as Professor and Chair of the Department of Translational Genomics, and Director of the Institute for Translational Genomics at the Keck School of Medicine of USC. Previously he was Professor and Deputy Director of Basic Sciences at the Translational Genomics Research Institute in Phoenix. Dr. Carpten's research background spans a very broad range of topics, including work in germline genetics, tumor genome analysis, cancer-cell biology and health disparities. His research program centers around the development and application of cutting-edge genomic technologies and bioinformatics analysis in search of germ-line and somatic alterations that are associated with cancer risk and tumor biology, respectively. His work spans many of the known cancer types, including prostate cancer, breast cancer, colon cancer, brain cancer, multiple myeloma and pediatric cancers. Dr. Carpten's focus is on understanding the role of biology in disparate cancer incidence and mortality rates seen among underrepresented populations. He was named a Science Trailblazer by Spectrum Magazine in 2006, and was awarded the Susan G. Komen Distinguished Lectureship on the Science of Cancer Health Disparities in 2014 for his work in ensuring that all people are equally represented in science and innovative health care. More recently, Dr. Carpten was awarded the AACR MICR Jane Cooke Wright Lectureship for his outstanding research in cancer disparities and his efforts to develop the careers of minority scientists. Dr. Carpten has served as a Senior Editor for Cancer Research, and as an ad-hoc editor for a number of high-impact journals. He has served on and chaired several National Institutes of Health (NIH) study sections, and is currently a permanent member of the National Cancer Institute's Board of Scientific Counselors. He also sits on one of the NIH's Director's Special Advisory Committees. He co-chaired the inaugural AACR Special Conference on the Science of Cancer Health Disparities, and will serve as Program Committee Chairperson for the AACR 2019 annual meeting in Atlanta.

Scott L. Delp, PhD

Scott Delp, PhD, is the James H. Clark Professor, the Founding Chairman of the Department of Bioengineering at Stanford University, and the Director of the National Center for Simulation in Rehabilitation Research. Dr. Delp transformed the field of biomechanics by creating highly accurate computer models of musculoskeletal structures and providing them to researchers worldwide using a software system (OpenSim) that he and his team developed. Dr. Delp invented fundamental technology for surgical navigation that is now in wide clinical use. Together with Mark Schnitzer, PhD, and their students, Dr. Delp developed novel microendoscopes that allow real-time in-vivo imaging of human muscle microstructure. Together with Karl Deisseroth, MD, PhD, and their students, Dr. Delp pioneered the use of optogenetics to control activity in the peripheral nervous system, leading to important inventions for treating paralysis, spasticity and pain.

Leslie A. Saxon, MD

An interventional cardiologist, Leslie Saxon, MD, is a Professor of Medicine and a clinical scholar at the Keck School of Medicine of USC. She specializes in wirelessly connected implantable and wearable devices that treat and diagnose heart conditions and prevent sudden death. Board-certified in cardiology, electrophysiology and heart failure, Dr. Saxon has authored more than 100 articles in various medical journals. She is an active member of several organizations and is a fellow at the Heart Rhythm Society.

Dr. Saxon is also the Executive Director of the internationally acclaimed USC Center for Body Computing (CBC). The CBC is a place for all USC schools, including medicine, engineering, business and cinematic arts, to form interdisciplinary relationships and accelerate the future of fully integrated, "connected" medicine. Dr. Saxon participates in the preclinical and clinical development and testing of wearable and implanted technology, including networked devices used in medicine, wellness and performance. Her active research programs involve connected sensors with elite athletes, military groups and patients. Her work is dedicated to providing users with continuous and protected information about their health or performance status. She leverages her clinical expertise to develop device models and software solutions that offer engaging, user feedback-based, real-time physiologic data.

Dr. Saxon has spoken at various forums, including TEDMED, SXSW and WIRED Health. She is regularly quoted in popular media outlets, including the Wall Street Journal, New York Times, BBC and Fast Company.

Maja J. Matarić, PhD

Maja Matarić, PhD, is Chan Soon-Shiong Professor of Computer Science, Neuroscience, and Pediatrics at USC, Founding Director of the USC Robotics and Autonomous Systems Center, and Vice Dean for Research in the Viterbi School of Engineering. Dr. Mataric got her master's and doctorate in computer science and AI from MIT, and her bachelor's in computer science from the University of Kansas. She is a fellow of AAAS, IEEE and AAAI, and the recipient of the U.S. Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring (PAESMEM), the Anita Borg Institute Women of Vision Award in Innovation, the Okawa Foundation Award, the NSF Career Award, the MIT TR35 Award and the IEEE RAS Early Career Award. Dr. Matarić is a pioneer of distributed robotics and, more recently, socially assistive robotics, and her research enables robots to help people through social interaction in therapy, rehabilitation, training and education, developing robot-assisted therapies for autism, stroke, Alzheimer's and other special needs, as well as wellness interventions (robotics.usc.edu/interaction). She has published extensively, authored the popular robotics textbook The Robotic Primer (MIT Press), and has served as associate editor on three journals and on the NSF CISE Advisory Committee and other advisory boards. Dr. Matarić is actively involved in K-12 STEM outreach, having obtained federal and industry grants to develop free teacher training and open-source curricular materials for in-school and after-school robotics courses that engage student interest in science, technology, engineering and math (STEM) topics and careers.

Juan Espinoza, MD

After completing his undergraduate degree at Washington University in St. Louis, Juan Espinoza, MD, received an Intramural Research Training Award (IRTA) at the Immunotherapy Unit of the National Institute on Aging at the National Institutes of Health (NIH). During his time at the NIH, Dr. Espinoza worked on small molecule design, developing new therapeutic and research tools. Successively, Dr. Espinoza attended the Keck School of Medicine of USC, receiving his medical degree in 2010. Dr. Espinoza completed his pediatric residency at Children's Hospital Los Angeles in 2013, and in 2014 he became an Assistant Professor of Clinical Pediatrics at Children's Hospital Los Angeles and the Keck School of Medicine of USC. His research interests include digital media and technology and their role in medicine and medical education, with a special focus on patient (user)-generated health data. These academic interests arise from his experiences outside of medicine; in 2010 he co-founded GC/MDDM, a small digital media production company that works with television, film, web and mobile technologies. Through this endeavor, he has partnered with both the entertainment and health care industries. Health care clients include the Alfred Mann Foundation, the UCLA Nathanson Family Resilience Center, Children's Hospital Los Angeles and Medallion Therapeutics. In each of these partnerships, Dr. Espinoza's role has been to create and implement technology and media solutions to health care and education problems. Dr. Espinoza utilizes these same principles in his teaching, research and clinical practice.

John P. Wilson, PhD

John P. Wilson, PhD, is Professor of Sociology and Spatial Sciences in the Dana and David Dornsife College of Letters, Arts and Sciences at USC, where he directs the Spatial Sciences Institute as well as the Wilson Map Lab. Dr. Wilson also serves as GIS Lead for the Spatial and Exposure Analytics Core in the Southern California Environmental Health Sciences Center, and holds appointments as Professor in the USC School of Architecture, the Keck School of Medicine of USC's Department of Preventive Medicine, the USC Viterbi School of Engineering's Departments of Computer Science and Civil and Environmental Engineering, and the Institute for Geographical Sciences and Natural Resources Research in the Chinese Academy of Sciences in Beijing. His research focuses on the modeling of human and environmental systems and makes extensive use of GIS tools, spatial analysis and computer models. He has published numerous books and articles on these topics, including Environmental Applications of Digital Terrain Modeling (Wiley-Blackwell, 2018) and two edited volumes, Terrain Analysis: Principles and Applications (Wiley, 2000) and the Handbook of Geographic Information Science (Blackwell, 2008). Much of this work is collaborative and cross-disciplinary with the goal of improving our understanding of the factors linking people, their environments and their well-being. The work of his lab group can be seen at johnwilson.usc.edu.

Randolph W. Hall, PhD

Randolph Hall, PhD, is the Vice President of Research at USC, where he oversees research advancement, administration and ethics. Dr. Hall's experience includes serving as the Founder/Principal Investigator for two national research centers, the Center for Risk and Economic Analysis of Terrorism Events (CREATE), and the National Center for Metropolitan Transportation Research (METRANS). He also served as Senior Associate Dean for Research in the Viterbi School of Engineering, and Chair of Industrial and Systems Engineering during the time the department became the first named academic department at USC upon receipt of a $10 million gift from Daniel J. Epstein. He is the author of several books and is editor of Patient Flow, Reducing Delay in Healthcare Delivery and the Handbook of Healthcare System Scheduling.

Dr. Hall has led the creation of policies to catalyze collaborative research, including changes in promotions and tenure, research attribution and shared repositories; funding programs that support collaborative research and shared equipment; and infrastructure and events enabling digital scholarship, as well as standards for research transparency and reproducibility. He has helped faculty create national research centers, built alliances with external research institutes, developed the Center for Excellence in Research; created the Washington, D.C.-based research advancement office; and built an integrated research office that encompasses contracts and grants, technology transfer, human-subject protection, animal resources, research ethics, research training, research advancement and internal grant programs. Dr. Hall serves on the boards for Keck Medicine and the Alfred Mann Institute at USC, is immediate past chair of the University Industry Demonstration Partnership, and is on the Executive Committee for the Southern California Innovation Alliance.
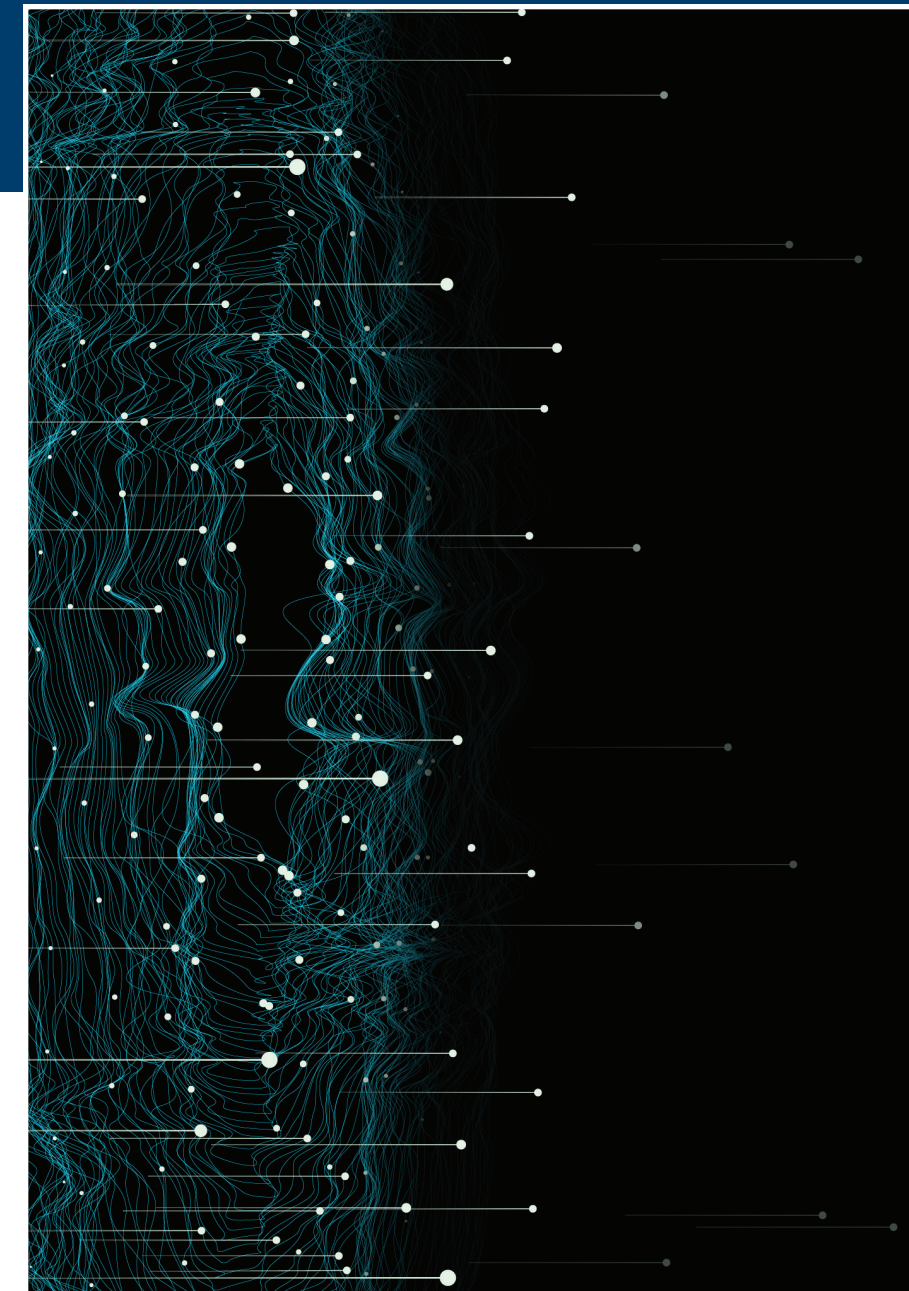
A HISTORY OF RESEARCH AT
CHILDREN'S HOSPITAL LOS ANGELES

The research program at Children's Hospital Los Angeles began in 1952. At that time, resources were allocated on a project-by-project basis with equipment borrowed from clinical laboratories. In the late 1950s, a decision was made to develop a strong basic research program, and several highly capable investigators were recruited to lead work in the areas of pathology, hematology-oncology and infectious diseases. During the 1960s those initial areas of inquiry expanded to include endocrinology, virology and genetics. The research program also began getting a national reputation for its success at obtaining federal funding, and it received its first endowment in 1965. During the next three decades, the institution continued to expand its research enterprise with new areas of focus, increases in National Institutes of Health funding and purpose-built research facilities.

Established in 1992, the Research Institute became The Saban Research Institute in 2003 following a $40 million gift in support of pediatric research made by Cheryl Saban, PhD, Haim Saban and The Saban Family Foundation.

In the course of its evolution, The Saban Research Institute has recruited transformative faculty members dedicated to basic, clinical and translational research to further our understanding of the developmental origins of health and disease. Researchers at The Saban Research Institute are committed to the health of the whole child, working in collaborations designed to accelerate the discovery, development and delivery of innovative preventive, diagnostic and treatment options. The Institute works with the local community as well as globally, focusing on individualized health and medicine, the developing mind, and regenerative medicine and cellular therapies.

NOTES

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Children's Hospital Los Angeles has been ranked the top children's hospital in California and among the best in the nation for clinical excellence with its selection to the prestigious U.S. News & World Report Honor Roll of children's hospitals for 2018-2019. CHLA is home to The Saban Research Institute, one of the largest and most productive pediatric research facilities in the United States. The hospital is also one of America's premier teaching hospitals through its affiliation since 1932 with the Keck School of Medicine of USC.

For more information, visit **CHLA.org**. Follow us on **Twitter**, **Facebook**, **Instagram**, **YouTube** and **LinkedIn**, or visit our hospital blog, **CHLA.org/BLOG**, and our research blog: **ResearCHLAblog.org**.