Dr. Larry Swanson has headed basic research laboratories in systems neuroscience at the Washington University School of Medicine (St. Louis), Salk Institute for Biological Studies, and University of Southern California. He is best known for discoveries related to the basic plan of neural systems controlling motivated and emotional behavior using experimental, neuroinformatics, and historical methods.

Swanson’s early behavioral research distinguished the periventricular hypothalamus as a key hotspot for controlling the fundamental survival behaviors eating and drinking that are accompanied by the corresponding drives, hunger and thirst. This finding stimulated his interest in discovering the basic structure-function organization of the brain subsystem underlying motivation and emotion in mammals. Data emerging from this work led naturally to current interests in explaining mechanisms of human and animal behavior—in health, in disease, and following traumatic injury—based on a novel global structure-function wiring diagram of the nervous system using a combination of experimental and theoretical approaches.

The paraventricular nucleus (PVH) of the periventricular hypothalamus is a key controller of eating and drinking behavior and early research by Dr. Swanson’s group discovered a highly differentiated structure-function architecture of the PVH. They also demonstrated how individual PVH subdivisions are integrated into anatomically and molecularly-defined neural circuits ranging from the hippocampus, amygdala, and prefrontal cortex in front, to the brainstem and spinal cord in back. Based on this circuit model, the group went on to define hypothalamic controllers for the other two classes of fundamental behaviors common to all animals—defensive (“fight or flight” to threats in the environment for survival of the individual) and reproductive (sexual and parental behaviors for survival of the species). This led to the identification of a longitudinal behavior control column in the medial hypothalamus and midbrain, along with similar though specialized circuitry associated with each node in the column. To date, this research has identified over 6,000 new axonal connections in the rodent central nervous system with experimental pathway tracing methods, and since 1992 they have been mapped onto common digital atlas and flatmap templates for direct comparison of connectivity and gene expression patterns.

A second early line of research in this fundamentally important mammalian brain circuitry uncovered the possibility of molecular switching of information flow in adult brain neural circuitry that may be regarded as structurally stable. The initial discovery was a dramatic change in the ratio of coexpressed neurotransmitters within individual rat PVH neurons caused by adrenal steroid hormones (Proceedings of the National Academy of Sciences, 1983). Similar results based on immunohistochemistry and in situ hybridization demonstrated altered neurotransmitter expression ratios in neurons of the
reproductive-defense behavior circuitry driven by the cyclical gonadal steroid levels associated with the estrus cycle in female rats (Proceedings of the National Academy of Sciences, 1987, 1989), and even accompanying the expression of associative fear conditioning in neurons of the amygdala (Behavioral Neuroscience, 2000). Overall, this line of research led to the phenotyping of neuron types based on three fundamental criteria: axonal connections, spatial distribution, and differential gene expression patterns for sets of transcription factors and neurotransmitter-related molecules (Progress in Brain Research, 1992).

These structure-function circuit analysis results involve most parts of central nervous system, and it is now clear that the mechanistic, biological explanation of behavior, thinking, and feeling requires understanding the basic organizing principles of the entire nervous system. The results of this research stimulated Dr. Swanson to produce:

- The first online knowledge management system for mammalian neural connectivity (BAMS: Nature Neuroscience, 2003). It is now being superseded by The Neurome Project website.
- A Foundational Model of Connectivity (Proceedings of the National Academy of Sciences, 2010), a formal modeling language for neural circuitry in all animals (NSyL: Journal of Comparative Neurology, 2013).
- And a prototype “Google maps” website for the brain (Frontiers in Neuroinformatics, 2015).

These tools, combined with the three criteria for defining neuron types (connections, location, and gene expression patterns), are foundational to Dr. Swanson’s current efforts to help create a complete connectome—and accompanying wiring diagram—of the mammalian nervous system—a neurome complementary to the genome (Proceedings of the National Academy of Sciences, 2015, 2016, 2017, 2018).

Dr. Swanson has been a member of the Society for Neuroscience (SfN) since 1970 and served as its president in 2012-2013. He has also been a member of the Cajal Club since 2002 and served as its president from 2004-2006. In 2015, he was elected to serve as Secretary General of the International Brain Research Organization (IBRO). He was elected a Fellow of the American Academy of Arts and Sciences in 2003 and a Member of the National Academy of Sciences in 2010. He is also a member of the Dana Alliance for Brain Initiatives (2005) and the Grolier Club (2010). He has received numerous awards including a Doctor of Laws (honoris causa) from Concordia University (shared with Eric Kandel; Montreal, 2003), an Alfred P. Sloan Research Fellowship, the Charles Judson Herrick Award in Comparative Neurology, a McKnight Foundation Neuroscience Investigator Award, two Senator Jacob Javits Distinguished Neuroscience Investigator Awards from NINDS, and the Institute of Neurobiology Medal for Outstanding Achievements in Neuroscience Research from UNAM. In addition, he was one of
the 100 most cited scientific researchers of the 1980s (one of the two most cited neuroscientists) according to the Institute for Scientific Information.


Dr. Swanson has also performed various administrative duties, including Chair of the Neuroscience Committee at the Salk Institute (1989-1990). Since coming to USC he has been a member of the Faculty Senate Executive Committee (1992-1993), was Dean of Research for the College of Letters, Arts, and Sciences under Morton O. Schapiro (1998-2000), and Co-Chaired the Research and Innovation subcommittee of the USC Strategic Planning Committee (2010-2011). In addition, he was Director of the Research and Graduate Program in Neurobiology (1993-1997), Founding Coordinator of the university-wide Neuroscience Graduate Program (1996-2004), Director of the university-wide NIBS-Neuroscience Research Program (2001-2004), and Chair of the Provost’s Neuroscience Advisory Group (2001-2006).


Dr. Swanson has also performed various administrative duties, including Chair of the Neuroscience Committee at the Salk Institute (1989-1990). Since coming to USC he has been a member of the Faculty Senate Executive Committee (1992-1993), was Dean of Research for the College of Letters, Arts, and Sciences under Morton O. Schapiro (1998-2000), and Co-Chaired the Research and Innovation subcommittee of the USC Strategic Planning Committee (2010-2011). In addition, he was Director of the Research and Graduate Program in Neurobiology (1993-1997), Founding Coordinator of the university-wide Neuroscience Graduate Program (1996-2004), Director of the university-wide NIBS-Neuroscience Research Program (2001-2004), and Chair of the Provost’s Neuroscience Advisory Group (2001-2006).

Dr. Swanson is a prolific author. He has written five books, translated with Neely Swanson three books written by the founder of modern neuroscience, Santiago Ramón y Cajal, and edited or co-edited seven other books. He has published over 200 peer reviewed research articles and over 70 chapters and
reviews. In 2017 Google Scholar identified about 72,000 citations for Dr. Swanson’s work, with an h-index of 130 and an i10-index of 263.
Larry William Swanson
Hedco Neurosciences Building
University of Southern California
3641 Watt Way, Los Angeles CA 90089-2520
Phone: (213) 740-5892
Email: lswanson@usc.edu

DEGREES
1972 Ph.D. in Neurobiology
Washington University School of Medicine, St. Louis
(L.G. Sharpe mentor, Laboratory of Neuropsychology, Dept. of Psychiatry; Eli Robbins chair)

1968 B.A. in Chemistry; Pomona College, Claremont CA

APPOINTMENTS
2012, 2018 Visiting Scientist
Department of Neuroscience; Columbia University, New York NY

2012-Present University Professor; University of Southern California, Los Angeles CA

2007-2013 Visiting Scholar; Department of Neurobiology, University of California Los Angeles

1995-Present Appleman Professor of Biological Sciences, Neurology, and Psychology
University of Southern California, Los Angeles CA

1990-Present Professor
Departments of Biological Sciences, Neurology, and Psychology; USC, Los Angeles CA

1985-1990 Investigator
Howard Hughes Medical Institute, The Salk Institute for Biological Studies, La Jolla CA

1980-1986-1990 Senior Member from Staff Scientist
The Salk Institute for Biological Studies, La Jolla CA

1980-1983-1986-1990 Assistant Adjunct Professor to Adjunct Professor
Department of Neurosciences, University of California San Diego, School of Medicine

1979-1980 Assistant Professor of Neurobiology
Department of Anatomy and Neurobiology, Washington University School of Medicine, St. Louis

1979 Visiting Assistant Professor
Department of Anatomy (H.G.J.M. Kuypers lab), Erasmus University, Rotterdam, Netherlands

1978 Visiting Associate Professor
Institute of Anatomy (W. Harkmark laboratory), University of Bergen, Bergen, Norway

1976-1979 Research Assistant Professor of Neurobiology
Department of Anatomy and Neurobiology, Washington University School of Medicine, St. Louis

1974-1976 Postdoctoral Fellow/Research Associate
Department of Biology (R. Levi-Montalcini laboratory), Washington University, St. Louis MO

1972-1974 Postdoctoral Fellow
Department of Anatomy (W.M. Cowan laboratory), Washington University, St. Louis MO
AWARDS

1977-1980  Alfred P. Sloan Foundation Research Fellowship in Neuroscience

1980       C.J. Herrick Award (American Association of Anatomists)

1985-1987  McKnight Foundation Neuroscience Investigator Award

1986-1993  Senator Jacob Javits Distinguished Neuroscience Investigator Award from NINDS

1991       100 most cited scientific researchers of the 1980s (one of two most cited neuroscientists) Institute for Scientific Information (Current Contents 13:4-8, 1992)

1996       Albert S. Raubenheimer Award (USC College of Letters, Arts & Sciences award for distinguished Faculty in combined research, teaching, and service)

2001       100 most cited neuroscience researchers, 1980-2000 (Institute for Scientific Information)

2003       Doctor of Laws (honoris causa), Concordia University, Montreal (awarded with Eric Kandel)

2005       USC Associates Award for Research (the University’s highest research award)

2006-2013  2nd Senator Jacob Javits Neuroscience Investigator Award from NINDS

2013       Institute of Neurobiology Medal and Lecture for Outstanding Achievements in Neuroscience Research, National Autonomous University of Mexico (UNAM), Juriquilla Campus, Querétaro

MEMBERSHIPS

1971-Present Society for Neuroscience (Secretary, 1998-2000; President, 2012-2013)

1975-Present American Association for the Advancement of Science (elected Fellow, 2002)

1995-Present International Society for the History of the Neurosciences

2002-Present Cajal Club (President, 2004-2006; Historian, 2008-present)

2003-Present American Academy of Arts and Sciences (elected Fellow, 2003)

2005-Present Dana Alliance for Brain Initiatives (Member, 2005)

2007-Present Los Angeles Institute for the Humanities (elected Fellow, 2007)

2010-Present National Academy of Sciences (elected Member, 2010)

2010-Present Grolier Club (elected Member, 2010)

2015-2017 International Brain Research Organization, IBRO (elected Secretary General, 2016-2017)

EDITORIAL

1984-1987  Journal of Neuroscience (Associate Editor)

1984-1988, 1994-1999 Neuroendocrinology (Editorial Board Member)
1984-Present  *Experimental Brain Research* (Member, Board of Editors)
1986-1992  *Trends in Neuroscience* (Editorial Board Member)
1987-Present  *European Journal of Neuroscience* (Founding Editorial Board Member)
1988-2011  *Brain Research Bulletin* (Editorial Advisory Board Member)
1989-1994  *Molecular and Cellular Neurosciences* (Associate Editor)
1993-2005  *Journal of Comparative Neurology* (Editorial Board Member)
1993-2002  *Brain Research* (Editorial Board Member)
1993-2006  *Brain Research Reviews* (Editorial Board Member)
1995-2014  *Journal of the History of the Neurosciences* (Editorial Board Member)
2007-2016  *Frontiers in Neuroanatomy* (Associate Editor)
2008-2018  *ASN Neuro* (Founding Editorial Board Member)
2012-Present  *Los Angeles Review of Books* (Contributing Editor)
2016-Present  *IBRO Reports* (Founding Editorial Board Member)
2016-Present  *Network Neuroscience* (Founding Associate Editor)

**LECTURES**

1983-2006  **Grass Foundation Lectures (13):** Dalhousie University, Nova Scotia (1983); Marshall University, Huntington, West Virginia (1984); East Tennessee State University (1985); University of Western Ontario (1985); University of Oklahoma (1986); University of Vermont (1987); Washington State University (1988); Jefferson Medical College, Philadelphia PA (1989); Purdue University (1990); Northeastern Ohio University College of Medicine (1991), University of Massachusetts at Amherst (1992); Northwestern University, Chicago IL (1995); Atlanta Chapter (2006)

1988  **Jan Swammerdam Lecture**, Netherlands Institute for Brain Research, Amsterdam
1989  **Jerzy Olszewski Lecture**, Montréal Neurological Institute, McGill University
1990  **Plenary Lecture, European Brain and Behavior Society** meeting, Stockholm
1993  **Keynote Lecture, Canadian Federation of Biological Societies**, Windsor, Ottawa
1994  **Markey Charitable Trust Lecture**, University of Rochester, Rochester NY
1996  **Presidential Plenary Lecture, Society of Biological Psychiatry**, 50th Anniversary Mtg., NYC
1998  **Special Lecture, Society for Neuroscience Annual Meeting**, Los Angeles
2004  **McKnight Foundation President’s Lecture**, Aspen CO
Overseas Plenary Lecture, Australian Neuroscience Society Silver Jubilee Meeting, Perth

Opening Plenary Lecture, XLIX Congreso Nacional de Ciencias Fisiológicas; Querétaro, Mexico
Murray Barr Lecture, University of Western Ontario, Canada
Opening Plenary Lecture, Neuroscience in the 21st Century Symposium, Univ. São Paulo

Invited Lecture, International Society for the History of the Neurosciences, Los Angeles

Presidential Symposium Lecture, American Neuropsychiatric Association, Savannah
Plenary Lecture, Collaborative Research in Computational Neuroscience Program, Los Angeles

Featured Lecture, American Association of Neurological Surgeons, San Diego
History of Neuroscience Lecture, Society for Neuroscience Annual Meeting, Chicago

Invited Lecture, Salk Institute 50th Anniversary Symposium, La Jolla

Joseph Erlanger Lecture, American Physiological Society, Washington DC
Inaugural Friedman Lecture, Mount Sinai School of Medicine, New York City

Pinckney J. Harman Memorial Lecture, Cajal Club, Barcelona

Segerfalk Lecture, Lund University, Sweden

Inaugural Floyd H. Gilles Lecture in Neuroscience Research, Children’s Hospital Los Angeles
Societas Physiologicae Holmiensis, Hillarp Lecture Hall, Karolinska Institutet, Stockholm, Sweden

Edward G. Jones History of Neuroscience Lecture, University of California at Davis
Keynote Lecture, Joint Kavli Institute for Brain and Mind at UCSD Symposium on Innovative Research and Institute for Neural Computation at the Salk Institute; Spring Retreat, La Jolla

Invited Lecture, Chinese Academy of Sciences, Institute of Neuroscience, Shanghai
Opening Plenary Lecture, 2016 International Conference of Physiological Sciences and 90th Anniversary of the Chinese Academy of Physiological Sciences, Beijing
Plenary Lecture, Korean Society for Neural Science Annual Meeting, Seoul
Opening Plenary Lecture, 2nd Federation of Latin American and Caribbean Neuroscience Societies Meeting, Buenos Aires
Annual Neuroscience Founders Lecture, University of California, San Diego

Plenary Lecture, Society of Neuroscientists in Africa, biannual meeting, Entebbe, Uganda
Opening Plenary Lecture, Society for the Study of Ingestive Behavior, 25th annual mtg, Montreal

Inaugural Foundations of Neuroscience Lecture, Sainsbury Wellcome Institute for Circuits & Behavior, University College London

COMMITTEES

1981-1985 NIH Study Section (Neurology B, Subcommittee I)
1983 NIMH Neurobiology Section Program Evaluation Committee (Chair, Neural Organization Panel)
1986-1995 McKnight Foundation Young Scholars Review Committee
1987 Society for Neuroscience (SfN), Nominating Committee
1989-1990 Institute of Medicine, Committee on a National Neural Circuitry Database
1992-1995  SfN Committee on Neuroscience Literacy (Co-chair, High School Workshop Committee (1994-95)
1993, 1996  SfN Gerard Prize Selection Committee
1995-1998  SfN Committee on the History of Neuroscience (Founding Chair, standing committee)
2006-2009  SfN Publications Committee (Neuroinformatics Committee liaison, 2009)
2006-2011  NIMH Board of Scientific Counselors
2007  American Academy of Arts & Sciences, Class II, Section 3 membership panel

CONSULTING
1984  World Bank, 6-week consultant to Beijing Medical College, People’s Republic of China
1987  Special Project on Instinct, Japan (Tsukuba, Tokyo, Osaka, Kyoto, Hiroshima)
1996-2000  Hereditary Disease Foundation, Board of Scientific Advisors
2001-2003  Renovis Inc., Scientific Advisory Board
2004  International Brain Research Organization (IBRO), Science Advisory Program
•  Chair, Evaluation of the Hungarian Academy of Sciences Institute for Experimental Science
2010-Present  Friedman Brain Institute, Mount Sinai Medical Center; External Advisory Committee
2015  Institute for Biomedical Sciences (ICB), University of Saõ Paulo, External Evaluation Committee

ADMINISTRATION
1989-1990  Chair, Neuroscience Committee, the Salk Institute for Biological Studies
1992-1993  Faculty Senate Executive Committee, University of Southern California
1993-1997  Director, Research and Graduate Program in Neurobiology, University of Southern California
1996-2004  Founding Coordinator, Neuroscience Graduate Program (University-wide), USC
1998-2000  Dean of Research, College of Letters, Arts and Sciences, University of Southern California (Dean of the College: Morton O. Schapiro)
2001-2004  Director, NIBS-Neuroscience Program, University of Southern California
2001-2006  Chair, Provost’s Neuroscience Advisory Group, University of Southern California
2010-2011  Co-Chair, USC Provost’s Strategic Planning Subcommittee: Research & Innovation

COMMUNITY SERVICE & MEDIA
2010  ALOUD Series, Library Foundation of Los Angeles: Robert P. Crease, author of The Great
CONTINUING EDUCATION

2006 (Summer)  
*Book illustration processes to 1900* (Terry Belanger, instructor), CALRBS, Graduate School of Education and Information studies at UCLA

2007 (Summer)  
*Descriptive bibliography* (Carl Burkhout, instructor), CALRBS, Graduate School of Education and Information studies at UCLA

2008 (Summer)  
*Book collecting: history & techniques* (Bruce Whiteman, instructor) CALRBS, Graduate School of Education and Information studies at UCLA

2009 (Summer)  
*Rare book cataloging* (Randal Brandt, instructor) CALRBS, Graduate School of Education and Information studies at UCLA

2010 (Summer)  
*History of the book* (Susan M. Allen, instructor) CALRBS, Graduate School of Education and Information studies at UCLA

POSTDOCTORAL FELLOWS

Paul Sawchenko  
(1979–1983)  
Professor and Wylie Vale Chair, the Salk Institute for Biological Studies, La Jolla CA

R. Wallace Lind  
(1982–1988)  
Novelist

Jan G. Veening (1983)  
Professor of Anatomy, Radboud Universiteit, Nijmegen, the Netherlands (retired)

Christer Köhler (1983)  
Global VP, Discovery Research Area CNS & Pain Control, Astra Zeneca International (formerly)

Lena Haglund (1983)  
Head, Medical Branch, Education Health Services, City of Strängnäs, Sweden

Richard B. Simerly (1984-1990)  
Professor of Molecular Physiology & Biophysics, Vanderbilt University School of Medicine

Professor of Biological Sciences, University of Southern California

Etsuko Wada (1986-1988)  
Senior Research Associate, National Institute of Neuroscience, Tokyo, Japan

Director of Movement Disorders, Huntington Hospital, Pasadena CA

Newton S. Canteras (1988-1992)  
Professor of Anatomy, University of São Paulo Institute of Biomedical Sci., São Paulo, Brazil
Ph.D. STUDENTS

Clifford B. Saper (1973-75, training shared with W.M. Cowan)  
Professor and Head of Department of Neurology, Beth Israel Deaconess Medical Center, Harvard
Dennis A. Brittain (1984-1988)  
Founder and owner, Medtron
Research Assistant Professor of Biological Sciences, USC (formerly)
Assistant Professor of Psychiatry, Yale University (formerly). Biotech startup (currently)
Associate Professor of Psychology, Boston College
Donna M. Simmons (1994-2006)  
Research Associate, University of Southern California (retired)
Assistant Professor of Anatomy, Department of Life Sciences, Los Angeles City College

MASTER'S DEGREE

Boundless Mind, Inc. Co-founder and COO

SABBATICAL

Gong Ju (1987)  
Fourth Military Medical University, Xi’an, China
Emiko Senba (1988-9)  
Wakayama Medical University, Japan

TEACHING

1983, 1985, 1986  
Teacher of the Year, Department of Neurosciences, University of California at San Diego
(list of all courses taught provided at the end of this document)
Publications are listed in the following categories:

- Books & Monographs (original)
- Books & Monographs (translations)
- Books & Monographs (edited)
- Chapters & Reviews
- Research Articles (peer reviewed articles)

Books & Monographs (original):


- Amazon “Textbooks” on Art History: ranked number 2 (April, 2018).

Books & Monographs (translations):


**Books & Monographs (edited):**


Chapters & Reviews:


Lindstrom, J., Tzartos, S., Gullick, W., Hochschwender, S., Swanson, L.W., Sargent, P., Jacob, M., & Montal, M. (1983) Use of monoclonal antibodies to study acetylcholine receptors from electric organs, muscle, and brain and the autoimmune


Research Articles:


Citation Classic, ISI Current Contents (1988).


Citation Classic, ISI Current Contents (1989).


Swanson, L.W., Kucharczyk, J., & Mogensen, G.J. (1978) Autoradiographic evidence for pathways from the medial preoptic area to the midbrain involved in the drinking response to angiotensin II. Journal of Comparative Neurology 178:645-660. PMID: 632374.


PUBLICATIONS: RESEARCH ARTICLES


PUBLICATIONS: RESEARCH ARTICLES


**Please note:** Books, as well as Chapters & Reviews, are listed in two separate sections above.
TEACHING

Teaching:


4. Mammalian Neuroanatomy. Department of Neurosciences, University of California, San Diego. Yearly, 1982-1989. Core course for graduate students. Gave all lectures (28) and directed laboratory. •1991-1998. Department of Biological Sciences, University of Southern California. Survey course for graduate students offered every two or three years.

5. Advanced Neurobiology. 1990-1997. Core course for graduate students, spread over two semesters. Gave one-third of lectures, for neuroanatomy section of course.


9. Seminar in Neurobiology: Brain Control of the Emotions. 2007, 2008 Spring, 2008 Fall (BISC462). Advanced undergraduate/graduate 2 unit course; gave all lectures and also led “journal club” session each week.

10. Brain Architecture. 2010 (BISC424). Course for advanced undergraduates and graduate students. Gave all 40 lectures, and co-led 15 discussion sections on interpreting human brain scans with Dr. Floyd Gilles.

