

# PHILIP STEVEN LOW, PHD

NeuroVigil Inc., 7606 Fay Avenue, La Jolla, CA 92037, USA  
T: +1-858-454-5134, F: +1-858-454-5164

Stanford University School of Medicine, 701-B Welch Road,  
Room 143, MC: 5742 Palo Alto, CA 94304-5742 USA

MIT Media Lab, 20 Ames St., Cambridge, MA 02139, USA

Computational Neurobiology Laboratory and Howard Hughes Medical Inst.  
Crick-Jacobs Center for Theoretical & Computational Biology  
10010 N. Torrey Pines Rd., La Jolla, CA, 92037, USA

[philip@neurovigil.com](mailto:philip@neurovigil.com)

[plow@stanford.edu](mailto:plow@stanford.edu) [low@media.mit.edu](mailto:low@media.mit.edu) [philip@salk.edu](mailto:philip@salk.edu)

Born: August 16<sup>th</sup> 1979, Vienna, Austria. Citizenship: Canadian.

## EDUCATION

- **University of California, San Diego**, La Jolla, CA, USA, 01-07:  
Ph.D in Computational Neurobiology  
Committee in charge: Charles F. Stevens (Chair), Terrence J. Sejnowski (advisor),  
Fred H. Gage (advisor), Sean P. A. Drummond, Larry R. Squire.
- **The University of Chicago**, Chicago, IL, USA, 96-00:  
Bachelors of Science in Pure Mathematics
- **Institut Le Rosey**, Rolle & Gstaad, Switzerland, 91-96:
- French Scientific Baccalaureate, specialization in Mathematics
- **Cours Hattemer**, Paris, France, 1984-1991

## EXPERIENCE

- **NeuroVigil, Inc.** La Jolla & Palo Alto, CA, USA. Founder, Chairman, President,  
CEO and CSO. 02/07 – current: Creating Wireless Non-invasive brain monitoring  
devices and algorithms with neurodiagnostic capabilities.  
Board of Advisors: Sonia Ancoli-Israel, Sydney Brenner, Fred Gage, Ronald  
Graham, Roger Guillemin, Philip Low, Terrence Sejnowski, Jerome Siegel, Donald  
Spencer, Andrew Viterbi and Stephen Wolfram.
- **Stanford University School of Medicine**, Stanford, CA, USA, 02/09-current  
Consulting Assistant Professor / EEGENE Project
- **M.I.T.**, Cambridge, MA, USA, 04/09-current  
Visiting Professor, Media Laboratory / WAND Project
- **Salk Institute for Biological Studies**, La Jolla, CA, USA, 09/01– 2/08:  
Research Affiliate, 1/09-current  
Post-doctoral Fellow, 11/07-1/09  
Graduate Student & Sloan-Swartz Fellow in Computational Neurobiology.  
Sejnowski & Gage labs, 09/01-10/07  
Devised SPEARS, the first single channel unsupervised human sleep EEG  
recognition algorithm.

- Hippocampal slice physiology, brain mapping, non-invasive recordings
- **The University of Chicago**, Chicago, IL, USA, Margoliash Laboratory, Research Assistant, 06/00 - 08/01, 06/02-08/02  
Developed EEG experimental technique and equipment for the zebra finch, *Taeniopygia guttata*, in order to understand sleep in a species without a neocortex.
  - **Harvard Medical School** / Brigham and Women's Hospital & Children's Hospital. Boston, Boston, MA, USA, Nowak Lab, Intern, 06-09/99: Verified in 9 weeks that Compound H, a Collagen Type I Inhibitor could halt the spread of fibroid tumors.

## PUBLICATIONS

"Ask not what the brain can do for sleep - ask what sleep can do for the brain"  
**P Low *Frontiers in Neuroscience* December 2009, Volume 3 Issue 3**

"The Antifibrotic Drug Halofuginone Inhibits Proliferation and Collagen Production by Human Leiomyoma and Myometrial Smooth Muscle Cells." MM Grudzien, **PS Low**, PC Manning, M Arredondo, RJ Belton, Jr & RA Nowak. *Fertil Steril*. 2009

"A non-Invasive EEG in Animals."  
M Bonjean\*\*, **P Low\***, L Wylie, B Nielsen, TJ Sejnowski, FH Gage. **Society for Neuroscience 2008 Abstracts**.  
\*1<sup>st</sup> author, \*\*presenter

"REM Revealed" PS Low, SC Barton, R Landreth, TJ Sejnowski. **Society for Neuroscience 2008 Abstracts**.

"Mammalian-like Features of Sleep Structure in Zebra Finches"  
**PS Low**, SS Shank, TJ Sejnowski & D Margoliash.  
*Proceedings of the National Academy of Sciences USA* (Track II) 2008 Jul 1;105(26):9081-6. Epub 2008 Jun 25.

"A New Way To Look At Sleep" **PS Low, Ph.D thesis**, p 1, Library of Congress, 2007

"Fine Structure of Human Sleep" **PS Low** & TJ Sejnowski. *In Review*

"REM revisited" **PS Low** & TJ Sejnowski. **Society for Neuroscience 2007 Abstracts**.

"Fine Structure of Human Sleep" **PS Low** & TJ Sejnowski. **Society for Neuroscience 2006 Abstracts**.

"A New Way To Look At Sleep" **PS Low**, FH Gage & TJ Sejnowski. **Society for Neuroscience 2005 Abstracts**.

"Dynamic Spectral Scoring: A New Way to Look at Sleep",  
**P Low**, FH Gage, & TJ Sejnowski. **WiR Workshop on Data-driven Modeling and Computation in Neuroscience**, Hohenwart Forum, Germany, May 2005.

"The anti-fibrotic drug halofuginone inhibits proliferation and collagen production by leiomyoma smooth muscle cells."

RA Nowak, **P Low**, JE Wubben, RJ Belton, Jr. 2nd NIH Int. **Congress on Advances in Uterine Leiomyoma Research. 2005.**

"An unbiased automated approach to single channel sleep scoring"

**P Low**, FH Gage & TJ Sejnowski. **Society for Neuroscience 2004 Abstracts.**

"A Pattern of Mammalian-like Features in Zebra Finch Sleep"

**P Low**, S Shank & D Margoliash. **Society for Neuroscience 2003 Abstracts.**

"The Organization of Sleep States in Zebra Finches"

**P Low**, S Shank & D Margoliash. **Computational Neuroscience 2003 Proceedings.**

## PATENTS

U.S. Patent Application Serial No. 61/255,343 filed November 11, 2009

U.S. Patent Application Serial No. 61/115,464 filed November 14, 2008, entitled "**Method of identification of new REM states in Human Sleep.**"

U.S. Patent Application Serial No. 61/114,986 filed November 14, 2008, entitled "**Non-invasive EEG on Animals**

U.S. Patent Application Serial No. 61/114,997 filed November 14, 2008, entitled "**Fine Structure of Human Sleep**"

PCT Patent Application Serial No. US2009/064632 filed November 14, 2008

PCT Patent Application Serial No. US2006/018120 filed May 9, 2006, entitled "**Automated Detection of Sleep and Waking States**"

U.S. Patent Application Serial No. 11/431,425 filed May 9, 2006, entitled "**Automated Detection of Sleep and Waking States**"

PCT Patent Application Serial No. US2005/027562 filed August 2, 2005, entitled "**Dynamic Signal Processing**"

U.S. Provisional Patent Application Serial No. 60/679,951 filed May 10, 2005, entitled "**Dynamic Signal Processing**"

Several other Patent Applications are currently being processed regarding novel ways to record, identify and use brain activity.

## AWARDS

**NSF-IGERT** Fellowship (2001)

**Merck** Fellowship (2001)

**Sloan-Swartz Fellowship** (2002-2007)

**Ray Thomas Edwards Award** (2006)

**Kavli Brain and Mind Award for Innovative Research** (2007)

**UCSD50K Entrepreneurship Competition** Finalist (2007), 1<sup>st</sup> Prize (2008)

Draper Fisher Jurvetson (**DFJ**), DFJ Frontier, and Zone Ventures Business Competition 250K winner-take-all Award (2008), overall winner

**O-1 Visa**, United States Government, “**extraordinary ability in Brain Signal Detection**” (2009)

**Qualcomm Q-Prize**, (2009), Top 3

1<sup>st</sup> International Congress on **Alzheimer’s Disease and Advanced Neurotechnologies**, President, Monaco (2000)

## PRESS

“Revolutionizing Sleep Science” **HuffingtonPost**, January 26, 2010

“The future of brain-controlled devices”, **CNN**, January 4, 2010

“Gadgets and Ideas to Revolutionize Healthcare” **WIRED**, November 4, 2009

Prediction: Mass market for mHealth sensors” **Mobihealthnews**, November 2, 2009

“iBrain Could Predict Drug Side Effects by Measuring Brainwaves”**DOTmednews**, November 2009

“Roche inks deal with sleep monitoring start-up” **Mobihealthnews**, November 2, 2009

“Using Sleep As A Gateway Into The Brain” **HuffingtonPost**, November 2, 2009

“TEDMED - Day 2” **MedGadget**, October 29, 2009

“Monitor sleep states from your mobile phone” & “OMB, Qualcomm, Intel and more” **Mobihealthnews**, October 29, 2009

“NeuroVigil and Roche Launch Personalized Neurodiagnostics Initiative for Enabling Preventive & Personalized Neurodiagnostics” **FORBES**, October 29, 2009

“Featured Company. NeuroVigil: Simplifying Sleep.” **Neurotech Insights™**  
THE NEUROTECHNOLOGY INDUSTRY NEWSLETTER, Vol 5:2, February 2009., p. 14

“Bird Brains Key to the Functions of Sleep.” **Science**. 2008 Dec 19;322(5909):1789.

“Sleep and sensorimotor integration during early vocal learning in a songbird”  
Sylvan S. Shank and Daniel Margoliash. **Nature**. 2008 Dec 14.

“Secret Sleep of Birds Revealed in Brain Scans”, **The New Scientist**, July 2<sup>nd</sup> 2008.

“In Sleep, We Are Birds of a Feather”, **The New York Times & International Herald Tribune July 1st 2008** as well as Discovery News, Scienceblogs.com, Yahoo! News, Biological Psychology, Newstrack india, Salk Institute, The Columbus Dispatch, SLEEPzine, University of New Mexico, dispatch.com, treasure.1x1y.com.cn, Brasil Imprensa Libre (Portuguese), Ultimo Segundo (Portuguese), Thaindian News, Webindia 123, Sunday Express, BIRDS.com, goo.ne.jp (Japanese), Newstin (Spanish).

“NeuroVigil Inc., a Salk Institute spin off, Wins First Prize at World-Class UCSD \$50K Innovation Competition”  
**Forbes, Business Wire CNBC, Market Watch, Reuters, CBS, FDA News, Fox Business, Business Wire, Yahoo! Finance, BioSpace, TD Ameritrade, Wallstreet Online, Smart Brief, Markets, Denver Post, Chicago Board Options Exchange, StreetInsider.com, Digital 50, World News Network, EIN News, biz San Diego, Banks.com, TradingMarkets.com, encyclopedia.com, Centre Daily Times, The Earth Times, San Diego Source Daily Transcript, eMedia World, Portofolio.com, INIT AKTIE (German), Finanz Nachrichten, Breitbart, Newstin, direktbroker.de, Clinica Space (Spring 2008).**

“Draper Fisher Jurvetson, DFJ Frontier, and Zone Ventures Award \$250,000 to NeuroVigil in Fourth Annual **DFJ Venture Challenge**”, **CNBC News, CBS News, Forbes, Market Watch, Business Wire, TED Feed, Yahoo Business, Yahoo Finance, MySpace News, Fox News, SocialTECH, Silicontap, Ecademy, tmcnet, Jordo Media, Technorati, Christine, Altavista, San Jose Mercury News, Finance Industry Today, Sleep Disorders News, MyFeedz.com, Pr-inside, EuroInvestor.co.uk, smartbrief.com, venturecapitalcentral.com, My Way Finance (Spring 2008).**

“Memories Are Made Like This”. **Howard Hughes Medical Institute Bulletin**. May 2007.

Researcher’s hub. E-newsletter. **CONNECT**. March 2007.

**Dispatches from the Frontiers of Science**, Proto Mass General. Fall 2007.

"The Secrets of Sleep". **MIT Technology Review**. December 2006.  
Science & Technology, p. 79

“Song Learning and Sleep”. **Nature Neuroscience** 2005 May;8(5):546-8.

"Sleeping with the Finches" **The Economist**. London. October 22<sup>nd</sup> 2003,

"To sleep, perchance to dream" & "The dream of the zebra finch" **Biomednet**, Elsevier Press. October 12th 2003.

**Who’sWho in America**, 2007-8. **Who’sWho in The World**, 2008-10

## TEACHING / MENTORING / TRAINING

**MIT**: NeuroVentures, guest Lecturer

**Stanford School of Medicine**: Sleep Grand Rounds

**UCSD:** Graduate Advanced Biology of Sleep Oscillations  
**SALK:** Sloan-Swartz Talks; non-invasive rodent EEG preparation:  
M. Bonjean, R. Landreth, L. Wylie; Sleep Analysis: H. Mien, I. Spokoyny, L. Schuetz,  
H. Schuetz;  
**University of Chicago:** avian EEG preparation: S. Shank

**NeuroVigil:** Data Acquisition Devices: K. Lui, P. Ng, J. Jou  
Analysis: S. Barton, R. Landreth

## SCIENCE & TECHNOLOGY LECTURES

NASA, Moffett Field, CA, USA. Summer 2010.  
**Aspen Brain Forum**, Aspen, Co, USA. Summer 2010.  
**Frontiers in Science and Technology**, San Diego, USA, March 2010.  
**X-Prize Visioneering Workshop**, Marina de Rey, CA, USA March 2010  
Novartis Pharmaceuticals, Basel, Switzerland. February 2010  
Hoffmann - La **Roche AG**, Basel, Switzerland. February 2010.  
Hoffmann - La **Roche AG**, Basel, Switzerland. January 2010  
Massachusetts Institute of Technology (**MIT**), Cambridge, MA, USA. November 2009  
**Qualcomm Q-Prize**, Sunnyvale, CA, USA. September 2009.  
**Roche** USA, Nutley, NJ, USA. May 2009.  
Invited Talk, **Scripps** Clinic Sleep Center, La Jolla, CA, USA. April 2009.  
**Johnson & Johnson**, Skillman, NJ, USA. March 2009.  
Invited Talk, Sleep Grand Rounds, **Stanford University**, Palo Alto, CA, USA. February 2009.  
SCANS lecture, **UCSD**, La Jolla, CA, USA. January 2009.  
Hoffmann - La **Roche**, Basel, Switzerland. January 2009.  
Hoffmann - La **Roche**, Basel, Switzerland. December 2008.  
**Society for Neuroscience**, Washington DC, USA. November 2008.  
**Qualcomm**, San Diego, CA, USA. October 2008.  
Massachusetts Institute of Technology (**MIT**), Cambridge, MA, USA. September 2008.  
Media Laboratory, Massachusetts Institute of Technology (**MIT**), Cambridge, MA, USA. September 2008.  
Massachusetts General Hospital, **Harvard Medical School**, Boston, MA USA. September 2008.  
**Johnson & Johnson**, Skillman, NJ, USA. September 2008.  
Novartis Pharmaceuticals, Basel, Switzerland. August 2008.  
**Qualcomm**, San Diego, CA, USA. August 2008.  
**Aspen Consciousness Research Retreat**, Aspen, CO, USA. July 2008.  
Invited Talk, **Keynote Address, IN3 Medical Summit**, San Francisco, CA. June 2008  
**UCSD**50K Triton Innovation Award Final, San Diego, CA, USA. May 2008.  
Fourth Annual **DFJ Venture Challenge**, Menlo Park, CA, USA. May 2008.  
Kavli Institute for Brain & Mind Symposium, **UCSD**, San Diego, CA, USA. May 2008.  
Rady Business School, **UCSD**, San Diego, CA. April 2008.  
McGovern Institute, Massachusetts Institute of Technology (**MIT**), Cambridge, MA, USA. April 2008.  
California Institute of Technology (**Caltech**), Pasadena, CA, USA. January 2008.  
Hoffmann - La **Roche AG**, Basel, Switzerland. December 2007.  
Novartis Pharmaceuticals, Basel, Switzerland. December 2007.  
Invited Talk, **Max-Planck-Institut** für Psychiatrie, Munich, Germany. December 2007.  
Wellcome Trust Centre for Human Genetics, **University of Oxford**, Oxford, United Kingdom. December 2007.  
**Society for Neuroscience**, San Diego, CA, USA. November 2007.  
Thesis Defense: “**A New Way To Look At Sleep: Separation & Convergence**”.  
**Salk Institute**, La Jolla, CA, USA. October 2007.

Invited Talk, **Scripps** Clinic Sleep Center, La Jolla, CA, USA. October 2007.  
Almaden Research Center, **IBM**, San Jose, CA, USA. September 2007.  
**Aspen Consciousness Research Retreat**, Aspen, CO, USA. August 2007.  
**UCSD50K** Triton Innovation Award Final, San Diego, CA, USA. June 2007.  
**Society for Neuroscience**, Atlanta, GA, USA. October 2006.  
Sloan-Swartz Annual Symposium, **Columbia University**, New York, NY, USA July 2006.  
Invited Talk, Keck Center for Integrative Neuroscience, **UCSF**, San Francisco, CA, USA. June 2006.  
Invited Talk, Sleep Grand Rounds, **Stanford University**, Palo Alto, CA, USA. June 2006.  
Invited Talk, Redwood Center for Theoretical Neuroscience, **UC Berkeley**, Berkeley, CA, USA. June 2006.  
UCSD Rady School of Management, **Salk Institute**, San Diego, CA, USA. April 2006.  
Sleep & Chronobiology, **UCSD**, San Diego, CA, USA. April 2006.  
Swartz Center for Computational Neuroscience, **UCSD**, San Diego, CA, USA. November 2005.  
Sloan-Swartz Annual Symposium, California Institute of Technology (**Caltech**), Pasadena, CA, USA. July 2005.  
Invited Talk, **Max-Planck-Institut** für Psychiatrie, Munich, Germany. May 2005.

Invited Talk, Data Driven Modeling and Simulation in Computational Neuroscience, **Hohenwart Forum**, Germany. Invited by Nobel Laureate B. Sakmann and G. Wittum. May 2005.  
Society of Research Fellows, **Salk Institute**, San Diego, CA, USA. October 2004.  
Merck Symposium, **UCSD**, San Diego, CA, USA. June 2004.  
Institute for Nonlinear Dynamics, **UCSD**, San Diego, CA, USA. May 2004.  
**Society for Neuroscience**, New Orleans, LA, USA. October 2003.  
Neurophysics Laboratory, **UCSD**, San Diego, CA, USA. February 2003.  
Sleep & Chronobiology, **UCSD**, San Diego, CA, USA. February 2003.  
Institute for Neural Computation, **UCSD**, San Diego, CA, USA. February 2003.  
Sloan-Swartz talk, **Salk Institute**, San Diego, CA, USA. February 2002.

Other talks and lectures have also been given or planned but cannot be listed here.

## PUBLIC SPEAKING: TELEVISION / DOCUMENTARY

**1<sup>st</sup> International Congress on Alzheimer's Disease and Advanced Neurotechnologies**, Monaco. February 2010  
**BIL:PIL**, San Diego, CA, USA. October 2009.  
**TEDMED**, San Diego, CA, USA. October 2009.  
“**The Mystery of Human Consciousness**”, a film by Dr. Ricardo Ainslie. Sponsored by Mind Science Foundation 2009  
“**Future of the Human Mind Symposium**”, Mind Science Foundation, Given Institute. Aspen, CO, USA. July 2008.  
“**Waking Up To Sleep**”, The Science Network, The Salk Institute, San Diego, CA, USA. February 2007.

## ACTIVITIES

American Association for the Advancement of Science (**AAAS**): Member, 2004-current.  
**AMPA** (Association Monegasque Pour L' Alzheimer's): Founding Member, Director of Scientific Advisory Board, 09-current.  
**Aspen Brain Forum**, in partnership with New York Academy of Sciences: Member, Scientific Advisory Board, 09-current.  
**Computational Neuroscience (CNS)**: Director and member, Travel Grant & Future Meeting Sites committees. 03-05.  
**Frontiers in Sleep and Chronobiology**: Review Editor, 2010-present  
**Institut Le Rosey** (high school): Chess Club founder and president 1991-96; Debate Club co-founder and co-president 94-96; Cultural Academy Vice-President, 1995-6; Students' UN member, 93-96; Ski and Tennis teams member, 91-96.

**International Congress on Alzheimer's Disease and Advanced Neurotechnologies in Monaco:** President 09-current.

**Mathematical Association of America (MAA):** Member, 1997-current.

**NeuroVigil, Inc:** Founder, Chairman, CEO and CSO, 2007-current.

**Society for Neuroscience (SfN):** Member, 2001-current.

**The Science Network (TSN):** Special Projects Advisor, 03-current.

**The University of Chicago (college):** Chess Club co-president, 99-01; French Club President, 00-01.

**UCSD / SALK (grad school):** Neuroscience Journal Club organizer, 01; Computational Neurobiology Journal Club member, 01-current; Synaptic Physiology Journal Club member; Computational Neurobiology Lounge founder, 01; Sloan-Swartz ChalkTalks organizer, 02. Society of Research Fellows, 02-09.

**X-Prize Foundation:** Life Sciences Advisor, 10-present.

## MISCELLANEOUS

Fluent in French, English and German. Working knowledge of Italian, Russian and various computer languages.