Curriculum Vitae

J.D. Daniels
Associate Professor
Division of Engineering

BSEE, UC Berkeley, 1968
MS, Bioengineering, UC Berkeley, 1972
Ph.D., Engineering, UC Berkeley, 1974
Thesis title:
"Synaptic organization in the vertebrate retina: Pharmacology via intracellular recording."
Advisor: Frank Werblin

Professional Appointments

Summer `65, `66, `67	Instrumentation Engineer Shell Oil Company Refinery, Martinez, CA
1968-69	Engineer (Operations Research)Westinghouse Electric, Defense & Space Center, Baltimore, MD
1969-1974	Teaching Assistant & Research Assistant, U.C. Berkeley, EE & CS Department, Bioengineering & Neuroscience Berkeley, CA Ph.D. thesis with Frank Werblin
1974-1977	Spencer and NIH Post-doctoral Caltech, Division of Biology, Pasadena, CA Research Fellow (with J.D. Pettigrew)
1977-1983	Assistant Professor Brown University, Division of Engineering Providence, RI
1981-1982	Senior Research Engineer Molecular Bio-Systems, San Diego, CA (Magnetic Drug Delivery)
1983-present	Associate Professor Brown University, Division of Engineering Providence, RI
1984-1985	Consultant Bell Communications Research, Morristown, NJ (Parallel Image Processing)
1995	Expert Witness, Law Firm of Gidley, Sarli & Marusak (Prov, RI)
1996	Consultant, (instrumentation) Technic, Cranston RI Consultant, Compulock, Weston, MA
2000-2001	Consultant, (Time Series Prediction) Adaptive Analytics (New York City)

-Publications

Digital Design from Zero to One, John Wiley & Sons, New York (1996).
Single-author 615 page textbook. website for book--additional chapters:
http://www.engin.brown.edu/faculty/daniels/DDZO/homepage.html

Daniels' Digital Design Lab Manual, John Wiley & Sons, New York (1996).

-Referred papers

“Gamma-aminobutyric acid antagonism in visual cortex: Different effects on simple, complex and hypercomplex cells," (with J. D. Pettigrew), *Science 182*: 81-83 (1973).

“A study of inhibitory antagonism in cat visual cortex," (with J. D. Pettigrew), *Brain Res. 93*: 41-63, (1975).

“Development of Neuronal Responses in the Visual System of Cats," (with J. D. Pettigrew), *Neural and Behavioral Specificity*, (ed. by G. Gottlieb), Academic Press, 196-232 (1976).

“Early development of X-cells in kitten LGN," (with Joyce Norman and J. D. Pettigrew), *Science 198*: 202-204 (1977).

“Biases for oriented moving bars in LGN neurons of normal and stripe-reared cat," (with Joyce Norman and J. D. Pettigrew), *Exp. Brain Res*. 29:155-172 (1977).

“M-cells: A binary logic model to account for some features of CNS inhibition," *Biol. Cyb. 29*: 1-9, (1978).

“Development of single unit responses in kitten LGN," (with J. D. Pettigrew and Joyce Norman), *J. Neurophysiol. 41*: 1373-1393 (1978).

“Progressive image transmission using a growth-geometry coding," (with Amalie J. Frank and Diane R. Unangst), *Proc. IEEE 68*: 897-909 (1980).

“The plastic response to monocular deprivation persists after chronic depletion of norepinephrine in kitten visual cortex', (with M. F. Bear) *J. Neurosci. 3*: 407-416 (1983).

“Two methods of catecholamine depletion in kitten visual cortex yield different effects on plasticity," (with M. F. Bear, M. A. Paradiso, M. Schwartz, S. B. Nelson, and K. M. Carnes), *Nature 302*: 245-247 (1983).

“Effects of intracortical infusion of 6-hydroxydopamine on the response of kitten visual cortex to monocular deprivation," (with M. A. Paradiso and M. F. Bear), *Exp. Brain Res. 51*: 413-422 (1983).

“Effects of luminance and flicker on ocular dominance shift in kitten visual cortex," (with E. Pressman, M. Schwartz, S. B. Nelson, and D. Kraus), *Exp. Brain Res. 54*: 186-190 (1984).

“Clonidine and visual cortical plasticity: Possible evidence for noradrenergic involvement," (with S. B. Nelson and M. Schwartz), *Dev. Brain Res. 23*: 39-50 (1985).

“Modeling and simulation I: Introduction and guidelines," (with A. B. Saul), *J. Electrophysiol. Tech*. 13: 95-109 (1986).

“Modeling and simulation II. Specificity models for visual cortex development,"(with A. B. Saul), *J. Electrophysiol. Tech. 13*: 211-231 (1986).

“The mechanical performance of ambulation using spring-loaded axillary crutches," (with J.R. Parziale), *Am. J. Phys. Med & Rehab. 68*: 192-195 (1989).

“Pyrotechnic illusion," *Nature 341:* 492 (1989).

[In 1971 and 1974 I published two non-technical essays in peer-reviewed magazines; one was a second-prize essay in a contest (Graduate School Experience) sponsored by the William James Center of the Wright Institute, Berkeley, CA. In 1982 another essay, “Teaching Digital Circuit Design Productively," won a prize in a contest sponsored by ASEE.]

Abstracts--prior to 1983-

From 1973 to 1981 I published 5 abstracts in Invest. Ophthalmol. Vis. Sci. (suppl.) with various coauthors and from 1975 to 1982 I published 6 abstracts in Soc. Neurosci. Abst. with various coauthors. During that interval I wrote 10 annual reports and internal technical memoranda at Caltech and Brown Univ.

-Abstracts--1983-

“Clonidine and visual cortical plasticity: New evidence for noradrenergic involvement" (with S. B. Nelson & M. Schwartz), Soc. Neurosci. Abst. 9: 911 (1983).

“The contribution of image movement and distance to kitten visual cortical development: A preliminary investigation," (with D. J. Kraus, and E. K. Pressman), Soc. Neurosci. Abst., 10: 471 (1984).

“The arrangement of visual stimuli in the monocularly deprived kitten's environment affects subsequent ocular dominance shift," (with D. J. Kraus), Invest. Ophthalmol. Vis. Sci. (suppl.) 26: 251 (1985).

“Adaptation effects from conditioning area 17 cortical units in cortical units in kittens during physiological recording," (with A. B. Saul), Soc. Neurosci. Abst. 11: 461 (1985).

“Ocular dominance, selectivity, and responsiveness in kitten area 17 neurons, after dark rearing plus brief monocular experience," (with A. B. Saul), Soc. Neurosci. Abst. 11: 462 (1985).

“Two methods of catecholamine depletion that yield different effects on plasticity both depress NE-stimulation of adenylate cyclase (ACase) activity," (with C. Aoki & P. Seikevitz), Soc. Neurosci. Abst. 11: 464 (1985).

“One week's monocular experience in 16Hz strobe illumination is adequate to promote complete ocular dominance shift in monocularly deprived kittens," (with A.B. Saul), Invest. Ophthalmol. Vis. Sci. (suppl.) 27: 245 (1986).

“A cosine function predicts the branching angle of an axon bifurcation as a ratio of cost before and after the junction," (with M. Motuz & A. Pelah), Soc. Neurosci. Abst. 12: 349 (1986).

“Hysteresis, memory and attention in electronic neural networks." (with Laura Sewall- & C. Brennan) Soc. Neurosci Abst. 14: 169 (1988).

-Invited Lectures--prior to 1984-

From 1977 to 1983 I gave 10 invited lectures at various places, including Caltech, UC Berkeley, Stanford, Salk Institute, Bell Labs, Univ of Washington Seattle.

-Invited Lectures: 1984-2009

“Influence of lighting and object arrangement on ocular dominance shift in kitten visual cortex," Rockefeller University, January 1984.

“Internal and external influences on kitten ocular dominance shift," Institut de la Vie, Lille, France, July 1984.

“Image-addressed memory: One component in a neural image computer," Bell Communications Research, Morristown, NJ, January 1985.

“Ecological factors in ocular dominance plasticity," Kenneth Craik Laboratory, Cambridge University; Cambridge, England; June 1986.

“Ecology of ocular dominance shift," State University of New York at Albany; October 1986.

Chairman, session on Development of Vision, symposium in honor of Horace Barlow, “Vision: Coding & Efficiency," Cambridge University, Sept. 1987.

“Neural network hardware," Thayer School of Engineering, Dartmouth, Oct. 1988.

“Neural network hardware for machine vision." University of Lowell, March 1989.

“Neural networks and object recognition," Universidad Simon Bolivar, Caracas, Venezuela, Jan. 1991.

“Neural networks for character recognition," GTECH Corp., April 1991.

“Neural Networks for Predicting 3-D Chaotic Motion, with Reference to Financial Data,” Keynote address for 3rd Workshop on Machine Vision, U Mass Dartmouth, Dec. 2009.

-Recent University Service

. Faculty Liaison, Brown University Wrestling team
. Frosh and Soph advisor for engineering students
. Reader of admissions folders, Division of Engineering
. Chair, Engineering Concentration Committee

. Chair, Faculty Committee on Admissions and Financial Aid (1994)
. Member, Committee on Medical Faculty Tenure (1995-1998)
. Member, Faculty Committee on Awards and Benefits (1998-2000)
. Advisor for FIRST robot design entry, team #1350, Brown Univ & LaSalle Academy, sponsored by Raytheon (2004-9)
. College Curriculum Committee (2009-)

-University Service (previous to 1993)

. Randall Fellow: Advisor for sophomores (1990-1992)
. University Committee on the Status of Women (1984-85)
. Institutional Animal Care and Use Committee
. Lectureship Committee (1986- 89)
. Committee on Academic Computing (1987)
. Neuroscience Library representative (1979-81)

-**Academic honors**

1964-68:	Regents Scholar, University of California at Berkeley,
1968-69:	Graduate School Industrial Fellowship from Westinghouse Electric for Johns Hopkins University, Baltimore, MD.
1971-73:	University Graduate Fellowship, UC Berkeley.
1974-75:	Spencer Foundation, Postdoctoral Fellowship, Division of Biology, Caltech, Pasadena CA.
1975-77:	National Eye Institute, Postdoctoral Fellowship, Division of Biology, Caltech, Pasadena CA.

-Research Grants

1978-81	Binocular Interactions On Area 18 Neurons," National Eye Institute, $167,357 total award.
1979	”Electronic Supplies for Growth Geometry Project" Bell Labs, $250.
1980	”Microprocessor Development System," Western Electric, $2,000.

1980-86 “Theoretical and experimental research into biological mechanisms underlying memory and learning" (L.N Cooper, PI), ONR contract N00014-86-K-0041, $10,000/yr. laboratory support; $20,000 supplement for computer purchase; 15% salary support.

1982 ”Behavior of Magnetic Microspheres *in vivo*, (Contract research at MBI, San Diego, CA), sponsored by Eli Lilly, Inc.,$75,000.

1983-1986 “Control of Ocular Dominance Shift," National Eye Institute, $243,286 total award.

1987 $1500 NIH-BRSG grant for collaborative work with Charles Elbaum on temperature mapping of central nervous system

1986-1989 “Nerve Net Node: An adaptive analog element for a connectionist neural system," Analog Devices Corp., $39,000 + donation of multipliers and PC AT boards.

1989-1991 ”3-D object recognition system" Kenner Products, $33,000

1993 ”Unrestricted support for computer graphics of text" Houghton-Mifflin Co., $2,500

1996 ”Support for purchase of Sparc Computer," John Wiley & Sons, $5,000

1996-present Book Royalties Gift from John Wiley & Sons, to Brown Univ, approx 500$/year.

2002-2005 McCune Foundation Grant to develop lab course combining bioengineering and neuroscience, approx $243,000

-Fellowships and teaching awards

1982: “Teaching digital circuit design productively," $500 for essay for ASEE project on Advanced Technologies in Engineering Education. Published privately with other essays by ASEE.

1983 ”Heath Care Technology: A Course in the Curriculum Advising Program," Wayland Collegium grant for summer salary, Brown University.

1983 Awarded BASIL computer from NIH and one month support at University Washington at Seattle training on computer

1986 Awarded a position in the Rockefeller University Summer Intensive Course in Laboratory Computing.

1988-89 Organizer (with 4 others) of Wayland Collegium Seminar Series on Philosophical Foundations of Cognitive Neuroscience. ($2000 salary support)

1990 AT&T grant, $17,444 for EE teaching laboratory equipment

1994-95 Houghton-Mifflin, approx $10,000, grant to help defray cost of text writing

1995 Technical Analysis Corporation President's Award as “Teacher of the Year" in Division of Engineering

-Research Service

1977-1981 Reviewer of NSF & NEI grants in perception, visual development and neural modeling. Reviewer of various textbooks in digital circuit design and bio-engineering.

2000 – present: Reviewer for *Pattern Recognition*

-Society Memberships
Phi Beta Kappa
Tau Beta Pi
Eta Kappa Nu
International Neural Network Society
IEEE

Research in progress
Human estimation skills as a function of perceptual modes
Vergence eye movements controlling robot arms
Measurement of chromostereopsis illusion
Algebraic theory for nerve cell dendrite bifurcations
Navigating with uncertainty
(Use of neural networks for time series prediction of financial data
Optimization method for baseball batting orders).

Other projects
Registration of images from nuclear cardiology and angiography (with Fraunhofer)
Optimization and axon branching patterns
Design of shock-absorbing crutch
Monitoring animal movement in the dark with X-band Doppler radar
Stereo stethoscope for monitoring cardiac electrical activity
Neural networks for color vision and color-blindness
Evolutionary algorithm compared to *espresso* for minimizing Boolean expressions
Breeding algorithms for colored tiling (jigsaw) problems

Supervised various UG Honors and Independent study students from engineering and neuroscience.

-Community Service

President, Board of Trustees: Mathewson St. United Methodist Church 2003--2009

Advisor: LaSalle H.S. FIRST Robot competition team (2003--2009)

Engineering ScM:

Ellen Barton--1989
Yohzou Saiki--1992
Luis Bascones--1992
Jon Kane--1996 (Region-based methods of medical image segmentation)
Monica Maurer-1997
John Raiti 2004

Ph.D's for research work in my lab:

Mark Bear (Neuroscience)--1984
Mike Paradiso (Physics)--1984
John Coleman (Engineering)--1985
Alan Saul (Applied Math)--1986
Eugene Cloithiox (Physics)--1990
David Durfee (CS & Independent)--1991
John Raiti projected: 2009

Other Dissertations signed:

Tony Lee (Engineering, with Prof Sumit Ghosh)--1996
Peter Walker (Engineering, with Prof Sumit Ghosh)--1996

-**Teaching**

FALL SPRING SUMMER

Spring 2008	on leave
Summer 08	Pre-College & SPARK Robotic courses
Fall 2008	EN1230, EN 1000
Spring 09	EN 1971, EN 1000
Summer 09	Pre-College and SPARK Robot design courses
Fall 2009	EN1230, EN 1000
Spring 10	EN 193Z, EN 1000

EN123: Bioinstrumentation
EN100: Projects in Engineering
ENGN193Z Robot Design
EN900-3 Robot Rover Derby