

Ray Luo.

Contact.

Ray Luo
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Los Angeles, CA 90024

Objective.

To obtain a research or teaching position in the areas of molecular, physiological, behavioral, and/or computational neuroscience, with emphases on plasticity, signaling, and/or statistical analysis.

Education.

fall 2005 -
present

University of California, Los Angeles.

Los Angeles, CA 90095.
Interdisciplinary Ph.D. program in Neuroscience.
Department of Neurobiology.
Advised by Tom Otis.

fall 2000 -
summer 2003

University of California, Berkeley.

Berkeley, CA 94720.
B.S. in Electrical Engineering and Computer Sciences.
Program in Computer Science.
Advised by James Landay.

fall 1998 -
spring 2000

Harvey Mudd College.

Claremont, CA 91711.
Majors in Computer Science and Mathematics.
Humanities Concentration in Cognitive Psychology.
Advised by Margaret Fleck, Francis Su, and Bill Banks.

fall 1994 -
spring 1998

Glen A. Wilson High School.

Hacienda Heights, CA 91745.

Ranked 1st out of 369 in the class of 1998.

Advised by Ida Weil.

Experience.

winter
2007

UCLA Life Sciences Core Curriculum.

Los Angeles, CA 90095.

As teaching assistant for Life Science 2: Cells, Tissues, and Organs, ran 3 hour biweekly laboratory sessions in chromatography, spectrophotometry, aquatic metabolism, rat dissections, histology, and statistical analysis. Held 3 hour discussion sections focusing on enhancement of topics from lecture, held biweekly office hours to help students with lecture material, homework, and lab reports. Responsible for grading all homeworks and reports, administering (proctoring) exams and answering questions about exams, sorting and grading exams, maintaining a course web grading database. Attended lectures, held review sessions, and volunteered time for extra help. Met and coordinated with course instructors and facility managers. With Rory Spence, Elizabeth Wong, Melvin Ku, Rene Chen, Alan Torres, and Sherry Soliman of UCLA Physiology Department. Supervised by Naranjala Tillakaratne of UCLA Physiological Science, Cameron Gundersen of UCLA Molecular and Medical Pharmacology, and Gaston Pfluegl of Life Sciences Core.

fall 2006

UCLA Department of Chemistry and Biochemistry.

Los Angeles, CA 90095.

As teaching assistant for Chemistry 110A: Physical Chemistry, ran discussion sections and problem solving sessions, held office hours to discuss lecture topics and homework problems, was responsible for grading homeworks and exams, maintained class roster and grade sheet, recorded comprehensive lecture notes. With Rob Brewster of UCLA Chemistry and Biochemistry. Supervised by Alex Levine of UCLA Chemistry and Biochemistry.

spring
2006

Tom Otis's Lab at UCLA.

Los Angeles, CA 90095.

Used extracellular and whole cell recording on rat cerebellar slices to investigate firing properties of Purkinje and Golgi cells. Used the diolistic and other approaches to inject lipophilic dyes onto cerebellar cell membranes for use in FRET with DPA and oxonol. Learned methods of dissection, cutting slices, maintaining and retooling a rig, making solutions, using the two-photon microscope, and particle delivery techniques. With Movses Karakossian of UCLA Neurobiology Department. Supervised by Tom Otis of UCLA Neurobiology Department.

winter
2006

Istvan Mody's Lab at UCLA.

Los Angeles, CA 90095.

Used whole cell patch clamp recording to measure input conductance of hippocampus cells in culture. Investigated bootstrapping methods and modeling in the NEURON environment. Learned basic techniques in electrophysiology. With Irina Sokolova of UCLA Neurology Department. Supervised by Istvan Mody of UCLA Neurology Department.

fall 2005

David Krantz's Lab at UCLA.

Los Angeles, CA 90095.

Used PCR to introduce restriction sites to *Drosophila* adaptor protein subunit genes and cloned them into bacteria. Ligated both adaptor protein (AP2, AP3) genes and vesicular neurotransmitter transporter (VMAT, VGLUT) genes to plasmid vectors (pGBT9, pGAD424). Used the yeast two-hybrid assay to test the interaction of AP proteins with the transporter C-terminal domain. Learned PCR, cell-based cloning, SDS-PAGE, yeast two-hybrid, and basic molecular biology lab techniques. Documentation available. With Hao Fei of UCLA Psychiatry Department. Supervised by David Krantz of UCLA Psychiatry Department.

summer
2005

Stottler Henke Artificial Intelligence Consulting.

San Mateo, CA 94404.

Maintained and debugged an artificial intelligence engine for commander decision making. Investigated robustness of the system by performing tests using Rational Purify, then debugged a xerces XML parser, a visualization engine, and our intelligent response module. Formulated a system for handling insane data that applies the SimBionic artificial intelligence design toolkit to the processing and filtering of ambiguous data, using variability estimates to determine which data to keep track of. Implemented simple insanity checks and storage of possible insane data in a data manager. Formulated insanity handling and track identity as Bayesian filtering problems with linear Gaussian transitions, derived an EM algorithm for inference, and showed that a recursive algorithm for calculating the posterior for such a model will have a space complexity on the order of the number of states. Investigated the use of decision theory to model rejection of insane data. Looked into memory corruption, noise checking, platform characteristics of real targets, and worked as a team using WinCVS.

With Ben Ball of SHAI IISM-CICOPT.

Supervised by Rob Richards of SHAI IISM-CICOPT.

fall 2004

UC Berkeley Cognition and Action Laboratory.

Berkeley, CA 94720.

Helped design, implement, and run experiments investigating short term plasticity in anticipatory postural adjustments in learning a button-triggered self unloading task. Analyzed and presented data using Matlab, SPSS, and Excell. Examined acceleration traces and average accelerations before and after catch trials to find short term plasticity in learning the postural adjustments.

Helped design, implement, and run experiments in fMRI analysis of a reaching task using directly cued, symbolically cued, and free-choice movements. Implemented the experiment in E-prime using a touch-screen interface. Helped incorporate the touch-screen into scanner and run fMRI experiments. Learned basics of fMRI safety and data analysis using SPM. Documentation available.

With Neil Albert of UCB Psychology and Jörn Diedrichsen of Johns Hopkins Lab for Computational Motor Control.

Supervised by Rich Ivry of CognAc.

spring
2003

UC Berkeley EECS Department.

Berkeley, CA 94720.

As TA for Electrical Engineering 120: Signals and Systems, graded homeworks and entered grades into a spreadsheet. Also helped answer student questions and directed discussions.

Supervised by Michael Gastpar of UCB Electrical Engineering.

fall 2002

UC Berkeley Cognition and Action Laboratory.

Berkeley, CA 94720.

Helped design and run experiments investigating bimanual coordination in motor control. Examined amplitude and spatial coupling in a directly cued reaching task while tracking eye movements to look for correlation and assimilation effects. Analyzed the data using SPSS and Matlab and reported on significant effects. Documentation available.

With Jörn Diedrichsen of UCB Psychology.

Supervised by Rich Ivry of CognAc.

summer
2002

Palo Alto Research Center.

Palo Alto, CA 94304.

Developed and maintained code for a tracking system based on particle filtering with hybrid Monte Carlo sampling. Experimented with metrics for determining the performance of Markov chain Monte Carlo algorithms. Incorporated phase information into edge-based likelihood function. Developed a second-order dynamical model for human movement and a beta-distributed temporal prior. Played around with rejection rates and simulated annealing in hybrid Monte Carlo filtering. Documentation available.

With Eunice Poon of Queen's University Computer Science.

Supervised by David Fleet of Digital Video Analysis.

spring
2002

UC Berkeley Group for User Interface Research.

Berkeley, CA 94720.

Staff programmer for Outpost, a tangible wall-sized interface for collaborative web site design that allows users to electronically link up post-it notes that denote web pages. Worked on timeline interface for saving and loading design sessions and on communicating with computer vision algorithms that track the appearance of notes.

With Katie Everitt and Scott Klemmer of UCB Computer Science.

Supervised by James Landay of GUIR.

fall 2001

UC Berkeley EECS Transfer Buddies Program.

Berkeley, CA 94720.

Served as Big Buddy for four new EECS transfer students. Gave advise on housing, academics, college life, and course schedules. Supervised by Susanne Kauer of Center for Undergraduate Matters.

summer
2001

Palo Alto Research Center.

Palo Alto, CA 94304.

Developed a likelihood function for steerable filter responses at depth discontinuities. Implemented wavelet filter sampling algorithm for static images and EM algorithm for fitting Gaussian and Laplacian mixture models. Analyzed histogram mixture models for describing amplitude and wavelength dependence of phase response. Compared models of parameterized amplitude and phase likelihoods. Documentation available.

With Eunice Poon of Queen's University Computer Science.

Supervised by David Fleet of Digital Video Analysis.

fall 2000

UC Berkeley Group for User Interface Research.

Berkeley, CA 94720.

Software development and testing for Quill, a gesture set design tool for pen-based user interfaces. Ran tests on the latest version of Quill for debugging. Worked on a input-zooming Java Panel for zooming arbitrary components placed by the user on the layered pane interactively.

With Chris Long of UCB Computer Science.

Supervised by James Landay of GUIR.

summer
2000

UC Riverside Visualization and Intelligent Systems Laboratory.

Riverside, CA 92521.

National Science Foundation Research Experience for Undergraduates Summer Fellowship. Team built autonomous Handyboard-based robot with mounted camera for obstacle visualization. Worked on robot/computer/camera communication (C), robot simulation and control GUI (Java Swing), and reinforcement learning algorithms (Java). Implemented Q-Learning with exploitation factor specification. Documentation available.

With Thuan Dinh and Pat Leang of UCR Electrical Engineering.

Supervised by Bir Bhanu of Vislab.

summer
2000

HRL Laboratories Information Sciences Lab.

Malibu, CA 90265.

Worked on project for Uncertainty Visualization / Advanced Battle Visualization System, a graphical touch panel command interface for visualizing uncertainties associated with real-time decision-making. Completed Swing-based skeleton for the information panel display. Participated in discussion of network protocols and project structure.

With Eric Huang of HMC Computer Science.

Supervised by Pete Tinker of HRL.

fall 1999

Pomona College Psychology Laboratory.

Claremont, CA 91711.

Experimental Research on response interference in categorical semantic processing. Studied human reaction time responses in sequentially conflicting categorical judgment tasks, applying a semantic coding model to disambiguate negative priming and semantic congruity effects. Designed and completed experiments in Superlab (Mac) that measured reaction times in categorical size-discrimination tasks where prime rejects acted as probe targets, analyzed the data in Excel and Minitab, and interpreted the results based on semantic congruity effects. Documentation available.

Supervised by Bill Banks of Pomona College Psychology.

Skills.

programming Proficient in Matlab, R, Java and Swing, C and C++, Standard ML, HTML, Tex and Latex. Experience with Perl, PostgreSQL, Lisp and Scheme, OpenGL, RenderMan, Prolog, assembly programming. Exposure to UML, Javascript. Most capable at Java and Matlab.

software Proficient in JBuilder, Forte for Java, Visual C++, MS Office, Minitab, Superlab, Microcal Origin. Experience with Mathematica, Adobe Photoshop and Premiere, Kaleidagraph, SPSS. Exposure to Maple, 3D Studio Max. Familiar with all flavors of Windows, Unix, X-Windows, Solaris. Have used Macs in the past.

language Fluent in Mandarin Chinese and Cantonese, three years (high school) experience in Spanish, some French and Russian and Japanese and Hindi and German.

laboratory Molecular biology, including PCR, cell-based cloning, clonal analysis, SDS-PAGE. Electrophysiology, including patch clamping, two-photon imaging, calcium imaging, slice physiology, field potentials. Technical report writing in chemistry, biology, expt psychology, and physics. Usability testing and video editing.

Achievements.

graduate Eugene V. Cota-Robles fellowship.

undergrad Fall 2002 spring 2001 honors, letter of commendation: Chemistry 22, dean's list: spring 1998 fall 1999 spring 2000, Goldwater scholarship nominee, scored 20 on Putnam exam, Mt. San Antonio College writer's day award in science fiction and fiction.

previous Valedictorian of Glen A. Wilson High, Tandy technology scholar, American Psychological Association award for academic achievement, Bank of America mathematics award, CA state Academic Decathlon (2nd place individual LA County; 10th state), Academic Olympiad (3rd place science), varsity cross country and track and soccer.

Interests.

neuroscience Learning and memory, vesicular trafficking, transporter and receptor physiology and structure, motor control and learning, psychiatric disease models, synaptic signaling, second messengers pathways, visual field analysis, motion analysis, neuronal circuits involved in timing, cerebellar function.

computation Probabilistic reasoning, Bayesian statistics, mathematical analysis and signal processing, computational vision, point and Poisson processes, reinforcement learning, robotics, logical foundations of artificial intelligence, statistical learning, graphical models, nonlinear filters, wavelets, neural nets.

psychology Attention disorders and interference effects, categories and prototypes, psycholinguistics, Gestalt processing, ground-feature analysis, bimanual motor control, sex differences, lateralization, circadian rhythms and temporal processing.

software Bioinformatics, computer graphics and cinema, intelligent interfaces, speech recognition, language understanding, intelligent internet systems, role-playing game interfaces.

spare time UCLA quiz bowl, robotics, writing fiction, 1930-1950 musicals,
philosophy of math, works of Virginia Woolf and Wittgenstein.

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