

RAY L C

design, art, intention

PROFILE

use knowledge of human brain and psychology to create intelligent devices, spaces, and fashions in interaction-based systems.



CONTACT

email | rayluo@ucla.edu
research | rayluo.boi.ucla.edu/projects
photography | facebook.com/rayLCphoto
portfolio | rayLC.org

EXPERTISE

software | adobeCC premiere rhino3d arduino

programming | matlab c++ processing js unity

languages | english chinese japanese spanish

design | photography drawing fabrication sew

EDUCATION

2017 - pres | Parsons School of Design
Design and Technology MFA candidate

2013 - 2017 | Tokyo MODE Gakuen (東京モード学園)
Fashion Technology, MPS 2017

2000 - 2003 | University of California, Berkeley
Electrical Engineering and Computer Sciences, BS 2003

EXPERIENCE

PARSONS SCHOOL OF DESIGN | 2017 - 2018
Research: built rotating 3-projector narrative installation with Prof Jess Irish

RIKEN BRAIN SCIENCE INSTITUTE & UCLA | 2012 - 2016
Research Scientist: rewards are necessary to reduce anxiety in everyday tasks

PALO ALTO RESEARCH CENTER | 2003 - 2005
Research Intern: built steerable filter and particle filter probabilistic tracking algorithm for predicting human positions in cluttered videos

UC BERKLEY GROUP FOR USER INTERFACE RESEARCH | 2002 - 2005
Research Assistant: built a wall-sized interface that uses computer vision to recognize gestures, post-it notes, and touch for web design

UC BERKELEY COGNITION AND ACTION LABORATORY | 2002 - 2005
Research Assistant: created virtual haptic environment in design of experiments

STOTTLER HENKE ARTIFICIAL INTELLIGENCE CONSULTING | 2005
Software Intern: built artificially intelligent command center interface, DARPA

EXHIBITIONS, GRANTS

2018 Verizon Connected Futures III grant: AI-based VR for emotional training for autism

2017 Winner Best Presentation: NYC Verizon Open Design Jam project on dating with AI

2016 Falling Walls Tokyo Speaker: "breaking down the wall of mystery of creation"

2015 JSPS Kakenhi Wakate B (科研費若手) grant-in-aid for young scientists 25871125

2014 12th 1_Wall Gallery exhibition: "ダンス目なし" at Guardian Garden Ginza

2012 Editor in Chief, UCLA Mental Note newsletter

2009 A&E Editor, UCLA Pacific Ties magazine, rep speaker at Campus Progress conference



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INTERESTS

3D fabrication
interactive installation
affective computing
statistical learning
fashion technology
narrative design



HUMAN NETWORKS

Want to make the world a better place for humans? Make humans a better species for the world. I study the interactions within and amongst humans that make it possible to improve human lives through better communication, from the multi-disciplinary perspectives of integrative design, neuroscience, and narrative art.

MACHINE INTELLIGENCE

Classical AI was an attempt to emulate thinking from the human mind point of view, while modern AI disards the human point of view entirely and attempts to make efficient algorithms. My aim is to instead, create intelligences embedded in intentional networks that make devices relatable to humans, so that our world can talk with us and we can communicate deeply with others and with ourselves.

CURRENT WORK

Machines are becoming specialized and hard to understand. Instead of simplifying in the digital realm, I aim to adapt the digital to humans by creating smart devices and spaces that evoke emotional reactions. They can be caring, flaky, trusty, nagging, attention-craving, occasionally angry, and mildly jealous. A harmonious future involves machines that are part of human ecology instead of opposing it.

[<https://recfreq.github.io/machines/machines.html>]

To allow people from different cultures and people with emotional deficits to communicate with each other, we're working on AI embedded fashion that allows smarter communication between humans using arduino and computer vision. We also use AI-reinforced VR environments to train those with emotional deficits.

[<https://recfreq.github.io/inusfashion/inusfashion.html>]

As the world become more saturated with news, scientific facts, and theories, we need a language that allows to show integrated concepts. One word can have different meanings in a given language, so "love" can mean familial love, sexual love, or love of country. I propose a language that uses multisensory stories as its basic morpheme. Experiments with the concept has been implimented in Processing.

[<https://recfreq.github.io/stream/stream.html>]

Looking to assist, collaborate, and converse in areas related to interactive art, product, space, UX, AI, and speculative design. I'm excited to work in interdisciplinary teams, as in my previous fashion, scientific, and art installation projects.

RAY LC (RAY LUO).

Parsons School of Design.
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EDUCATION.

- 2017 [**Parsons, the New School for Design.**](#)
MFA program in [Design and Technology](#), New York, NY 10011.
- 2012 [**University of California, Los Angeles.**](#)
Interdisciplinary Ph.D. program in [Neuroscience](#), Los Angeles, CA 90095.
Department of [Neurobiology](#), advised by Dr. Tom Otis.
- 2003 [**University of California, Berkeley.**](#)
B.S. in [Electrical Engineering and Computer Sciences](#), Berkeley, CA 94720.
Departments of EECS and Mathematics, advised by Dr. James Landay.

RESEARCH EXPERIENCE.

[**Carla Diana Research at Parsons School of Design**](#), New York, NY (2017).

Building a robotic lamp that changes lighting and movements based on facial and gestural responses from the viewer using computer vision. Part of project on "social lives of objects" using intelligent machines. Mentored by Carla Diana of [Parsons School of Design](#).

[**Jessica Irish Research at Parsons School of Design**](#), New York, NY (2017).

Built a rotating projector system that displays text and image from three sources as they rotate around the room, as part of an installation for a gallery in the Catskills. Mentored by Jessica Irish of [Parsons School of Design](#).

[**Johansen Neural Circuitry of Memory Lab at RIKEN BSI**](#), Tokyo, Japan (2015).

Recorded *in vivo* from optogenetically identified dopamine neurons in the ventral tegmental area, and determined their projection targets in fear and extinction learning tasks. Found that dopamine neurons, in particular those projecting to nucleus accumbens, is necessary for fear extinction learning, and that their modulation lead to differential MAPK phosphorylation in mPFC and amygdala. Evidence also comes from voltammetry measurements of dopamine release in accumbens. Supervised by Josh Johansen of [RIKEN Brain Science Institute](#).

[**Tom Otis's Lab at UCLA**](#), Los Angeles, CA 90095 (2012).

Used diolistics and whole cell patch to inject lipophilic dyes onto cerebellar cell membranes for use in FRET with voltage sensing DPA. Found that in the cerebellar molecular layer, parallel fiber conduction velocity is increased by GABA receptor activation, in slice and in a computational model with a customized Hodgkin-Huxley Na activation curve. Mentored by Tom Otis of [UCLA Neurobiology Department](#).

[**Istvan Mody's Lab at UCLA**](#), Los Angeles, CA 90095 (2009).

Used whole cell patch clamp recording to measure input conductance of hippocampus cultured cells. Used bootstrapping methods and modeling in the NEURON environment to characterize these cells. Supervised by Istvan Mody of [UCLA Neurology Department](#).

[**David Krantz's Lab at UCLA**](#), Los Angeles, CA 90095 (2009).

Introduced restriction sites to *Drosophila* adaptor protein and vesicular transporter genes. Used yeast two-hybrid assay to test interaction with transporter C-terminal domain. With Hao Fei of [UCLA Psychiatry Department](#). Mentored by David Krantz of [UCLA Psychiatry](#).

[**UC Berkeley Cognition and Action Laboratory**](#), Berkeley, CA 94720 (2005).

Investigated short term plasticity in anticipatory postural adjustments in learning a button-triggered unloading task. Examined catch trials performance in a virtual haptic environment as a proxy for postural learning. Design, implement, and run experiments in fMRI of a reaching task using directly cued and symbolically cued movements. [Documentation available](#). Supervised by Rich Ivry of [CognAc](#).

Palo Alto Research Center, Palo Alto, CA 94304 (2005).

Developed code for tracking a human figure in a cluttered video stream using a particle filter algorithm with hybrid Monte Carlo sampling. Experimented with metrics of performance of Markov chain Monte Carlo algorithms. Incorporated steerable phase information into an edge-based likelihood function for improved prediction. [Documentation available](#). Supervised by David Fleet of [Digital Video Analysis](#).

UC Berkeley Group for User Interface Research, Berkeley, CA 94720 (2004).

Software development and testing for [Quill](#), a gesture set design tool for pen-based user interfaces. Worked on a input-zooming Java Panel for zooming arbitrary components placed on the layered pane. Performed user testing of gesture-based user interfaces and analyzed the effectiveness of gesture sets on portable PDA-like devices. Supervised by James Landay of [GUIR](#).

UC Riverside Visualization and Intelligent Systems Laboratory, Riverside, CA 92521 (2003).

National Science Foundation Research Experience for Undergraduates Summer Fellowship. Built autonomous Handyboard-based robot with on-board camera. Worked on board communication (C), robot simulation and control GUI (Java Swing), and implemented Q-value - based reinforcement learning with exploitation factor specification. [Documentation available](#). Supervised by Bir Bhanu of [Vislab](#).

Pomona College Psychology Laboratory, Claremont, CA 91711 (2003).

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 experiments in Superlab that measured reaction times in categorical size-discrimination tasks where prime rejects acted as probes. [Documentation available](#). Supervised by (the late) Bill Banks of [Pomona College Psychology](#).

PROFESSIONAL EXPERIENCE.

Stottler Henke Artificial Intelligence Consulting, San Mateo, CA 94404 (2006).

Maintained and debugged an artificial intelligence engine for commander decision making. Performing robustness tests using Rational Purify and debugged a xerces XML parser. Formulated a system for handling insane data that applies the SimBionic artificial intelligence design toolkit using variability estimates to determine data tracking. Supervised by Rob Richards of SHAI [IISM-CICOPT](#).

UC Berkeley Cognition and Action Laboratory, Berkeley, CA 94720 (2005).

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. Programmed interface in Visual C++. Analyzed the data using SPSS and Matlab. [Documentation available](#). Supervised by Rich Ivry of [CognAc](#).

UC Berkeley Group for User Interface Research, Berkeley, CA 94720 (2005).

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. Supervised by James Landay of [GUIR](#).

Palo Alto Research Center, Palo Alto, CA 94304 (2005).

Developed a likelihood function for steerable filter responses at depth discontinuities. Implemented wavelet filter for images and EM algorithm for fitting Gaussian and Laplacian mixture models. Used histogram mixture models for fitting amplitude and wavelength dependence of phase response. [Documentation available](#). Supervised by David Fleet of [Digital Video Analysis](#).

HRL Laboratories Information Sciences Lab, Malibu, CA 90265 (2003).

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. Supervised by Pete Tinker of [HRL](#).

TEACHING EXPERIENCE.

Parsons: the New School for Design, New York, NY 10011 (2017).

TA for Communications Design PUCD 2035: Creative Computing. Helped student understand design principles in the context of using creative technologies such as interactive programming. Worked with Robby Kraft at [Parsons Communications Design Program](#).

Waseda University Dept of Life Science & Medical Bioscience, Tokyo, Japan 162-8480 (2015).

Developed and taught course IPSE Molecular Cell Biology A (autumn 2015) to students from biology division at Waseda University. Ran course and lectured on biochemistry, protein structure, DNA replication and repair, chromosome structure. Ran course on active student participation that leads to info discovery. Worked with Dr. Thomas Chater at [RIKEN BSI](#) and Dr. Masamitsu Sato of [Waseda University](#).

Doshisha University Faculty of Life and Medical Sciences, Kyoto, Japan 602-8580 (2015).

Lectured to first year graduate students in the course Recent Advances in Neuroscience on movement control, computational modeling of circuits, cell types in the cerebellum, fear and extinction learning, and optogenetic methods. Reviewed the relevant literature and addressed student questions in small groups. Invited by Dr. Hiroaki Taniguchi of [Doshisha University](#).

Waseda University School of International Liberal Studies, Tokyo, Japan 169-8050 (2014).

Developed and taught course LE204: Basics of Life Science (2014-16) to students with little biology experience in SILS department. Gave introductory lecture as well as lectures on chemistry, organelles, sensory and motor systems, physiology, neuroscience, origin of life, and reproduction. Used discovery-based discussion format that motivated participation. Invited by Dr. Akiko Uchida of [Waseda University](#).

Juntendo University School of Medicine, Tokyo, Japan 113-8421 (2014).

Gave over 10 lectures to medical students on topics such as cerebellar circuits in movement and timing ([presentation](#)), psychology of influence and implicit learning, post traumatic stress disorders, and the culture of science in America. Held question and answer session about general science as well as career objectives. Invited by Dr. Junichi Azama and Dr. Toshie Agawa of [Juntendo University](#).

UCLA Department of Psychology, Los Angeles, CA 90095 (2011).

As teaching assistant for Introductory Psychology, ran weekly discussion sections on topics such as emotion, memory, social psychology, development, and clinical neuroscience. Supervised research participation outside of course. Worked with Jennifer Shultz of [UCLA](#).

UCLA Department of Neurobiology, Los Angeles, CA 90095 (2010).

Graduate student responsible for training undergrads under the URC/CARE Undergraduate Research Fellows Program. Helped students learn dissection, experimental, and analytical techniques. Helped students engage in research, analyze data, and understand journal articles and helped produce [posters](#). Trained Patty Araj, Mariam Al-Hamad, and Vivvy Tran at [UCLA](#).

UCLA Life Sciences Core Curriculum, Los Angeles, CA 90095 (2010).

TA 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 s and held biweekly office hours to engage and help students. Supervised by Naranjala Tillakaratne of [UCLA Physiological Science](#) and Gaston Pfluegl of [Life Sciences Core](#).

UCLA Department of Chemistry and Biochemistry, Los Angeles, CA 90095 (2010).

Teaching assistant for Chemistry 110A: Physical Chemistry. Ran discussion sections, held office hours and review sessions. Graded homeworks and exams, maintained grade sheet. Supervised by Alex Levine of [UCLA Chemistry and Biochemistry](#).

UC Berkeley EECS Department, Berkeley, CA 94720 (2005).

Teaching assistant for Electrical Engineering 120: [Signals and Systems](#), graded homeworks, and helped answer student questions and directed discussions. Supervised by Michael Gastpar of [UCB Electrical Engineering](#).

SELECTED EDITING-SPEAKING EXPERIENCE.

The Mental Note newsletter, Los Angeles, CA 90095 (2012).

Editor-in-chief of UCLA's online neuroscience newsletter. Attended Cognitive Neuroscience at [Montreal](#), [Brain Awareness week](#) at UCLA, participated in outreach to K-12 students, produced a news video, and edited articles by [undergrads](#) and [graduate students](#). Society for Neuroscience [BAW educational video contest](#) with [entry](#) on fear conditioning. With founder Dr. Angela Rizk-Jackson of [UCLA Psychology](#).

UCLA Pacific Ties newsmagazine, Los Angeles, CA 90095 (2011).

Arts and entertainment editor for UCLA's Asian Pacific Islander magazine, winner of publication of the year for [Campus Progress](#). Sought out opportunities and arranged interviews for our writers, and edited A&E stories. Selected credits include articles on emerging [Asian American artists](#), Chinese students in the [Middle East](#), LA's [East-West players](#), review of an [Indian classic](#), an architectural [marvel](#), and movie [reviews](#). Edited by Maria Lu, Malina Tran, and Stephanie Aguilar of [Pac Ties](#).

UCLA Daily Bruin newspaper, Los Angeles, CA 90095 (2010).

Arts and entertainment writer and video journalist at UCLA. Reported on events and conferences likes [Society for Neuroscience](#) and [College Art conference](#). Selected credits on local [theatre outreach program](#), Asian American [arts movement](#), a multidisciplinary [dance showcase](#), UCLA's school of theatre [productions](#), Ethiopian [food](#), and video about [mentorship through dance](#). Edited by Kate Stanhope of [Daily Bruin Arts and Entertainment](#) and produced by Kattie Lam of [Daily Bruin Video](#).

Campus Progress National Conference Introductory Speaker, Washington, DC (2009).

Introduced Speaker of the House Nancy Pelosi in annual Campus Progress national youth conference.

[UC Berkeley Scientific Journal](#), Berkeley, CA 94720 (2005).

Worked on design (InDesign) and editing of an undergraduate research journal. Helped with layout and copy editing. Published on [protein folding simulation](#) aided by sequence alignment. Supervised by Leah Carroll of [Berkeley Sociology](#).

COMPETITIVE AWARDS.

- 2018 [Verizon Connected Futures III](#) Grant Award, with Cabello, Fukuoka, Hai, and Lim.
- 2017 [Winner Best Presentation](#) Parsons Verizon AI Design Jam, with Wu and Mittelstadt.
- 2015 [JSPS Kakenhi wakate B](#) (科研費若手) 25871125 grant-in-aid young scientists at RIKEN.
- 2013 [Nou Pro strategic research program](#) (脳プロ) 11041047 training grant at RIKEN BSI.
- 2011 [National Science Foundation STEM DIGSSS](#) travel award to Cold Spring Harbor Suzhou
- 2010 [Forum of European Neuroscience](#) travel award to Amsterdam from SfN
- 2010 [Computational Neuroscience internship](#) travel award to Okinawa from OIST Japan
- 2009 [NIH neural microcircuits](#) training grant at UCLA.
- 2008 [Microelectrode techniques](#) travel award from Marine Biological Association UK
- 2006 [Eugene V. Cota-Robles](#) fellowship at UCLA.
- 2000 [Tandy Technology](#) scholar award.

SELECTED PUBLICATIONS.

- 2017 Luo, R.*, Uematsu, A.*, Weitemier A., Aquili, L., Koivumaa, J., McHugh, T. J., Johansen, J. P. A dopaminergic switch for fear to safety transitions. In pres: *Nature Communications*.
- 2012 Dellal, S. S.*, Luo, R.*, and Otis, T. S. GABA_A receptors increase excitability and conduction velocity in cerebellar parallel fiber axons. [J. Neurophysiology](#), 107(11):2958-2970 (2012). (* equal contribution)
- 2009 Bradley, J., Luo, R., Otis, T. S., DiGregorio, D. A. Submillisecond optical reporting of membrane potential *in situ* using a neuronal tracer dye. [J. Neuroscience](#), 29(29):9197-209 (2009).
- 2003 Luo, R. Learning categories using semantic priming in a Bayesian framework. [California Engineer](#), 81(2):18-23 (2003).
- 2003 Luo, R., Fleet, D. J. Edge-based likelihoods for visual tracking. Palo Alto Research Center, [September TR](#) (2003).

SELECTED RESEARCH ABSTRACTS.

- 2015 7th International Symposium on Optogenetics, Tokyo Medical Dental University, [poster](#).
- 2015 45th Society for Neuroscience meeting, Chicago IL, [poster](#).
- 2015 38th Japan Neuroscience Society annual meeting, Kobe Japan, [poster](#).
- 2015 Doshisha University Faculty of Medical Sciences, invite Hiroaki Taniguchi, Kyoto, talk.
- 2014 Juntendo University Medical School M2/M3 series, invite Dr. Junichi Azuma, Tokyo, talk.
- 2013 RIKEN BSI Annual Retreat, Karuizawa, Japan, [poster](#).
- 2012 Harvard Genetics Seminar talk and visit, invite Dr. Jesse Gray, Boston, MA, talk.
- 2012 UCLA Undergraduate Research Fellowship Program colloquium, Los Angeles CA, [poster](#).
- 2011 2nd Cold Spring Harbor Computational Cognitive Neurobiology, China, [workshop](#).
- 2011 UCLA Interdepartmental Neuroscience Program retreat, Los Angeles CA, [talk](#).

2011 Gordon Conference on Cerebellum in Health and Disease, New London NH, [poster](#).
 2010 13th Annual UCLA Science Poster Day, Los Angeles, CA, [poster](#).
 2010 7th Forum of European Neuroscience, Amsterdam Netherlands, [poster](#).
 2010 7th Okinawa Computational Neuroscience Course, Okinawa Japan, [talk](#).
 2010 17th Cognitive Neuroscience meeting, Montreal Canada, [article](#).
 2010 UCLA department of Neurobiology annual retreat, Malibu CA, poster.
 2009 RIKEN Brain Science Institute Summer Program, Tokyo Japan, [poster](#).
 2009 4th UCLA Dynamics of Neural Microcircuits Symposium, Los Angeles CA, [poster](#).
 2008 UCLA Neuroscience Graduate Forum, Los Angeles CA, [talk](#).
 2008 12th UCLA Brain Research Institute Neuroscience poster, Los Angeles, CA, [poster](#).
 2008 38th Society for Neuroscience meeting, Washington DC, [poster](#).
 2008 38th Society for Neuroscience meeting, Washington DC, [abstract](#).
 2008 25th Microelectrode Techniques for Cell Physiology, Plymouth UK, [workshop](#).
 2007 UCLA department of Neurobiology retreat, Laguna Beach CA, poster.
 2005 UC Berkeley Molecular and Cell Biology poster fair, Berkeley CA, poster.
 2005 UC Berkeley Psychology undergraduate research fair, Berkeley CA, poster.
 2004 Palo Alto Research Center undergraduate colloquium, Palo Alto CA, [poster](#).
 2003 Palo Alto Research Center undergraduate colloquium, Palo Alto CA, [talk](#).

REFERENCES.

[Prof. Jessica Irish](#), Professor of Design and Technology, Parsons School of Design (research).
 66 Fifth Avenue, New York, NY 10011 | irishj@newschool.edu
[Prof. Sven Travis](#), Professor of Media and Design, Parsons School of Design (teaching).
 79 Fifth Avenue, New York, NY 10011 | sven@newschool.edu
[Prof. Carla Diana](#), Professor of Product and Industrial Design, Parsons (research).
 79 Fifth Avenue, New York, NY 10011 | carladiana@newschool.edu
[Dr. Anthony Dunne](#), Professor of Design and Emerging Technology, Parsons (research).
 66 Fifth Avenue, New York, NY 10011 | anthony.dunne@newschool.edu
[Dr. Joshua P. Johansen](#), Team Leader, RIKEN Brain Science Institute (research).
 2-1 Hirosawa, Wako-shi, Japan 351-0198 | jjohans@brain.riken.jp | +81-48-462-1111
[Dr. Toshie Agawa](#), Professor of English, Juntendo University (teaching).
 2-1-1 Hongo, Bunkyo-ku, Tokyo, Japan 113-8421 | t-agawa@juntendo.ac.jp
[Dr. Thomas S. Otis](#), Professor, UCLA Department of Neurobiology / Director, Roche (research).
 CHS 63-251, 10833 Le Conte Ave, CA 90095 | thomas_stephen.otis@roche.com
[Dr. Felix E. Schweizer](#), Professor, UCLA Department of Neurobiology (research).
 CHS 63-323, 650 Charles E. Young Dr, CA 90095 | felixs@ucla.edu | 310-794-5733
[Dr. Angela Rizk-Jackson](#), Analyst, University of California San Francisco (editing).
 401 Parnassus Ave, UCSF, CA 94143 | Angela.Rizk-jackson@ucsf.edu | 415-514-8516
[Dr. David A. DiGregorio](#), Professor, Institut Pasteur Department of Neuroscience (research).
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[Dr. David Fleet](#), Professor, Computer Science Department, University of Toronto (research).
 IC Building, 1265 Military Trail, Toronto, Canada | fleet@cs.toronto.edu | 4169468485