

YOU (LILIAN) CHENG

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AREA OF RESEARCH

Human Navigation, Brain-Inspired Computing, Computational Neuroscience, Neuroimaging

EDUCATION

Ph.D. Candidate, Cognitive Neuroscience

Sept. 2019 – Present

University of California, Irvine (UCI), Irvine, CA, USA

Dissertation: Travel Direction as a Fundamental Component of Human Navigation (Advisor: Dr. Elizabeth R. Chrastil)

Committee Members: Dr. Jefferey Krichmar, Dr. Bruce McNaughton, Dr. Emily Grossman, Dr. Ramesh Srinivasan

M.S., Cognitive Neuroscience

Dec. 2020

University of California, Irvine (UCI), Irvine, CA, USA

M.A., Geography

Sept. 2019

University of California, Santa Barbara (UCSB), Santa Barbara, CA, USA

Thesis: The Influence of Handedness on Mental Rotation of Hands (Advisor: Dr. Elizabeth R. Chrastil)

Committee Members: Dr. Mary Hegarty, Dr. Daniel R. Montello

B.S., Psychology

June 2014

South China Normal University (SCNU), Guangzhou, Guangdong, China

Thesis: The Influence of Doppler Effects on Ponzo Illusion (Advisor: Qi Chen)

GRANTS & FELLOWSHIPS

- 2021 Cascade Mentoring Fellowship (\$6,000). *School of Social Sciences, UCI*
- 2020 Social Sciences Instructional Fellowship (\$2,500). *School of Social Sciences, UCI*
- 2019 Methods U at UCSB Scholarship. *Graduate Division, UCSB*
- 2019 Crossroads Fellow (\$8,000). *UCSB*
- 2018 Summer Research Fund (\$2,400). *Department of Geography, UCSB*
- 2014 Zhang Wenjin Fellowship (\$400). *SCNU*
- “The influence of time perception on time-based prospective memory.” PI (Co-PI, Yinxin Liang) National Undergraduate Training Program for Innovation and Entrepreneurship Grant No. 201210574079, 2/16/12 - 2/16/13 (\$1,000). *Ministry of Education of the People’s Republic of China*
- “The mechanism of mixed-prospective memory.” Co-PI (PI, Yinxin Liang), University Undergraduate Training Program for Innovation and Entrepreneurship Grant 3/15/12 - 3/15/13 (\$200). *SCNU*

AWARDS & HONORS

Academic

- 2021 Roger W. Russell Scholar’s Award (\$1000). *Center for the Neurobiology of Learning and Memory, UCI*
- 2021 Audience Choice Award. *Associated Graduate Students (AGS) Virtual Symposium, UCI*
- 2021 AGS Virtual Conference Grant Award. *Graduate Division, UCI*
- 2020 Trainee Professional Development Award (TPDA). *Society for Neuroscience*
- 2018 Graduate Students Association Conference Travel Award. *Graduate Division, UCSB*
- 2017 - 2018 Jack & Laura Dangermond Travel Scholarship Award (four times, \$2300 in total). *Department of Geography, UCSB*
- 2015 Marie A. Center Memorial Travel Award. *Dartmouth College*
- 2015 Neukom Travel Award (\$1000). *Dartmouth College*
- 2013 Excellent Student in Academic Research. *School of Psychology, SCNU*

Professional Development

- 2021 1st Place Winner of the Business Pitch Competition. *GPS STEM & Beall Applied Innovation, UCI*
- 2020 Finalist in AI4Good 2020 Hackathon. *TECHAiDE*
- 2020 Runner-Up in WaiDATATHON for Sustainable Future. *WaiACCELERATE & Women in AI (WAI)*
- 2012 Excellent Student in Social Activities. *School of Psychology, SCNU*
- 2011 Third Prize in Chinese Calligraphy Contest. *SCNU*
- 2010 Excellent Award in Special Investigation Competition. *SCNU*

PRE-PRINT PUBLICATIONS

- 't Hart, B. M., Achakulvisut, T., Blohm, G., Kording, K., Peters, M. A. K., Akrami, A., ... Hyafil, A. (2021, February 15). Neuromatch Academy: a 3-week, online summer school in computational neuroscience. *OSF preprint* <https://doi.org/10.31219/osf.io/9fp4v> pdf

REFEREED JOURNAL PUBLICATIONS

- **Cheng, Y.**, Hegarty, M., Chrastil, E. R. (2020). Telling right from right: the influence of handedness in the mental rotation of hands. *Cognitive Research: Principles and Implications*, 5, 1-18. pdf
- Sun, L., Tan, P. *, **Cheng, Y. ***, Chen, J., Qu, C. (2015). The effect of altruistic tendency on fairness in third-party punishment. *Frontiers in psychology*, 6, 820. *denotes equal authorship pdf
- Qu, L., Dou, W., **Cheng, Y.**, Qu, C. (2014). The processing course of conflicts in third-party punishment: An event-related potential study. *PsyCh journal*, 3(3), 214-221. pdf

BOOK CHAPTERS

- Chrastil, E. R., **Cheng, Y.**. Central Coordination and Integration of Diverse Information to Form a Single Map. In R. D. Montello & K. M. Curtin (Eds.), *Collective Spatial Cognition: A Research Agenda*. Routledge (Taylor and Francis). (*in press*)

MANUSCRIPTS IN PREP AND UNDER REVIEW

- **Cheng, Y.**, Ling, S., Stern, C. E., Huang, A., Chrastil, E. R.. Travel Direction as a Fundamental Component of Human Navigation. (*in preparation*)
- **Cheng, Y.***, Granger, S.*, Le, A.*, Levis, S., Guzowski J., Yassa M.. Inflammation in Medial Temporal Lobe. (*in preparation*) *denotes equal authorship
- **Cheng, Y.**, Chrastil, E. R.. The Distributed Human Neural System for Head Direction. (*in preparation*)
- **Cheng, Y.**, Chrastil, E. R.. From Individual Cognitive Maps to a Collective Cognitive Map: Prescriptive Guidelines and Measurement of Factors that Could Distort the Mapping Process. (*in preparation*)

REVIEW

Ad Hoc Journal Referee

- Quarterly Journal of Experimental Psychology
- Communications Biology

Conference Proposal Referee

- 2021 Grace Hopper Celebration of Women in Computing (vGHC) - CFP Proposals for Workshops and Presentations in the Data Science Track

Application Review

- Neuromatch Academy 2021 - Computational Neuroscience Student Application

Curricular Review

- Neuromatch Academy 2021 - Computational Neuroscience Tutorials (Model Types, Machine Learning, Reinforcement Learning, Deep Learning, Neuroscience Refresher Introduction)
- Neuromatch Academy 2021 - Deep Learning Tutorials (Parameter Sharing: ConvNets and RNNs, Modern RNNs, Attention and Transformers, Reinforcement Learning Basics)
- Coursera Guided Project (3D SARS-CoV-19 Protein Visualization With Biopython)

Oral Presentations

- **Cheng, Y.**, Chrastil, E.R.. Head Direction Signals During Navigation. *Virtual Spring CNLM Conference - Memory: It's About Time, Virtual. May, 2021.*
- **Cheng, Y.** Finding the Compass: Head Direction Signals in the Human Brain. *UCI CNLM Awards Ceremony, Virtual. May, 2021.*
- **Cheng, Y.**, Chrastil, E.R.. The Emergence of Head Direction Signals in Human Navigation. *UCI Associated Graduate Students (AGS) Symposium, Virtual. April, 2021. Audience Choice Award.*
- **Cheng, Y.**, Ling, S., Stern, C. E., Huang, A., Chrastil, E.R.. Travel Direction as a Fundamental Component of Human Navigation. *Neuromatch Conference 3.0, Virtual. Oct., 2020.*
- **Cheng, Y.**, Ling, S., Stern, C. E., Huang, A., Chrastil, E.R.. Travel Direction as a Fundamental Component of Human Navigation. *Interdisciplinary Navigation Symposium (iNAV), Virtual. Oct., 2020.*
- **Cheng, Y.** Travel Direction as a Fundamental Component of Human Navigation. *UCI Cognitive Sciences Advancement Talk, Virtual. March, 2020.*
- **Cheng, Y.** Travel Direction as a Fundamental Component of Human Navigation. *UCI Cognitive Sciences Department Graduate Student Presentation Bonanza, Irvine. Jan., 2020.*
- **Cheng, Y.** What Are the Sex Differences in Navigation Training? Using the Sea Hero Quest Dataset. *UCSB Crossroads Symposium, Santa Barbara. Nov., 2019.*
- Downs, M., Davis, F., Brun, J., Huang, T., **Cheng, Y.** Greater Than the Sum of the Parts: Collaboration in the U.S. LTER Network. *International Long-Term Ecosystem Research Open Science Meeting (ILTER OSM), Leipzig, Germany. Sept., 2019.*
- **Cheng, Y.** Domain-General Distance Representation. *Spring Quarter UCSB Geography Department Colloquium, Santa Barbara. May, 2019.*
- **Cheng, Y.**, Chrastil, E.R.. From Individual Cognitive Maps to a Collective Cognitive Map: Prescriptive Guidelines. *Collective Spatial Cognition Specialist Meeting, Santa Barbara. April, 2019.*
- **Cheng, Y.** Left Hand, Right Hand. *2018 Spatial Lightning Talks, UCSB Center for Spatial Studies. University of California, Santa Barbara. Feb 9, 2018.*
- **Cheng, Y.**, Liang, Y., Tang, Z.. Mixed Time-Based and Event-Based Prospective Memory: A Behavioral Study. *the 16th National Academic Congress of Psychology, Nanjing, China. Nov., 2013.*

Poster Presentations

- **Cheng, Y.**, Chrastil, E.R.. The Emergence of Head Direction Signals in a Complex Environment. *Annual Meeting of the Organization for Human Brain Mapping (OHBM), Virtual. June, 2021.*
- **Cheng, Y.**, Chrastil, E.R.. The Emergence of Head Direction Signals in Human Navigation. *spatial@ucsb.global2021: Spatial Data Science for a Sustainable Future, Virtual. June, 2021.*
- **Cheng, Y.**, Chrastil, E.R.. The Emergence of Head Direction Signals in Human Navigation. *Cognitive Neuroscience Society (CNS) Annual Meeting, Virtual. March, 2021.*
- **Cheng, Y.**, Chrastil, E.R.. The Emergence of Head Direction Signals in Human Navigation. *Interdepartmental Neuroscience Program (INP) recruitment session, Virtual. Jan., 2021.*
- **Cheng, Y.**, Chrastil, E.R.. The Emergence of Head Direction Signals in Human Navigation. *Society for Neuroscience Global Connectome, Virtual. Jan., 2021.*
- **Cheng, Y.**, Chrastil, E.R.. The Emergence of Head Direction Signals in Human Navigation. *Psychonomic Society Annual Meeting, Virtual. Nov., 2020.*
- Downs, M., Brun, J., Huang, T., **Cheng, Y.** Greater Than the Sum of the Parts: Collaboration in and Beyond the U.S. LTER Network. *Ecological Society of America Annual Meeting, Virtual. Aug., 2020.*
- **Cheng, Y.**, Ling, S., Stern, C. E., Huang, A., Chrastil, E.R.. Travel Direction as a Fundamental Component of Human Navigation. *Interdepartmental Neuroscience Program (INP) recruitment session, Irvine. Jan., 2020.*
- **Cheng, Y.**, Ling, S., Stern, C. E., Huang, A., Chrastil, E.R.. Travel Direction as a Fundamental Component of Human Navigation. *Psychonomic Society Annual Meeting, Montreal, Canada. Nov., 2019.*
- **Cheng, Y.**, Hegarty, M., Chrastil, E.R.. Embodied Experience of the 'Wrong' Hand, Not World Knowledge, Supports the Mental Rotation of Hands. *Psychonomic Society Annual Meeting, New Orleans, USA. Nov., 2018.*
- **Cheng, Y.**, Hegarty, M., Chrastil, E.R.. Performance Discrepancy Between Left-handers and Right-handers Reveals Multisensory Integration in the Mental Rotation of Hands. *Spatial Cognition, Tübingen, Germany. Aug., 2018.*
- **Cheng, Y.**, Ling, S., Stern, C. E., Huang, A., Chrastil, E.R.. Travel Direction as a Fundamental Component of Human Navigation. *Interdisciplinary Navigation Symposium (iNAV), Quebec, Canada. June, 2018.*

- **Cheng, Y.**, Ling, S., Stern, C. E., Huang, A., Chrastil, E.R.. Are You Getting Closer to the Sun or to the Moon? An Unusual Motion Adaptation Effect of Travel Direction. *spatial@ucsb.local2018, UCSB Center for Spatial Studies. University of California, Santa Barbara. June, 2018.*
- Chrastil, E.R., Nicora, G., Davis, R., Smith, J., **Cheng, Y.**. The Influence of Decision-Making on Spatial Learning and Memory: An Individual Differences Approach. *Society for Neuroscience Annual Meeting, Washington DC, USA. Nov., 2017.*
- **Cheng, Y.**, Qu, C.. Cost Consideration Driven by Prosociality in Third-party Punishment: Using Feedback Related Negativity. *Society for Neuroscience Annual Meeting, Chicago, USA. Oct., 2015.*

RESEARCH EXPERIENCE

- Cognitive Anteater Robotics Lab, UCI** Jan. 2021 – Present
PI: Dr. Jeffrey Krichmar
 Irvine, CA
- Study the artificial neural network of travel direction system in the human brain
 - Utilize computational modeling and virtual robot simulation
- Spatial Neuroscience Lab, UCI** Sept. 2019 – Present
PI: Dr. Elizabeth R. Chrastil
 Irvine, CA
- Study the biological neural network of travel direction system in the human brain
 - Utilize psychophysics, virtual reality, and fMRI
- Spatial Neuroscience Lab, UCSB** July 2017 – Sept. 2019
PI: Dr. Elizabeth R. Chrastil
 Santa Barbara, CA
- Studied distance perception and handedness in spatial cognition
 - Lab moved from UCI to UCSB in 2019

MEDIA COVERAGE

- Research on sex differences in navigation featured in "UCSB Crossroads," 2019/20 UCSB Graduate Division Magazine p.45 (11/15/19)

UNIVERSITY TEACHING EXPERIENCE

- Curriculum Development & Instructional Materials**
- Developed a website "Building your teaching styles" to help college TAs/Instructors build teaching styles
 - Developed a teaching video "Sex Differences in Navigation from a Human Geographer's Perspective" (for undergraduate psychology, geography, neuroscience, and anthropology courses)
- Instructor of Record** Summer 2021
"Psychology Fundamentals", UCI
 Remote
- Design the content structure, assignments, discussions, exams, grading metrics, and supervise TA activities
 - Give accumulated 4.5 h-long weekly lectures to 52 undergraduate students on in-depth general psychology topics, including learning, memory, motivation, thought processes, emotion, language, intelligence, and development
- Social Sciences Instructional Fellow** Summer 2020
School of Social Sciences, UCI
 Irvine, CA
- Trained in online teaching through UCI Division of Teaching Excellence and Innovation
 - Assisted 1 professor in School of Social Sciences in addressing some of the challenges in transitioning to emergency remote teaching
- Teaching Assistant** Fall 2017 – Spring 2018
"Human, Place and Space", UCSB
 Santa Barbara, CA
- Prepared and delivered interactive lectures that blended scholarly research, critical thinking, and global trend
 - Led structured group discussions of over 70 students, advised diverse student population on assignments, helped students grasp challenging course material
- Teaching Assistant** Spring 2016
"Cognition", Dartmouth College
 Hanover, NH
- Advised diverse student population on assignments, helped students grasp challenging course material
 - Assisted guest lecturer with conducting hypnosis on volunteered students in class

MENTORING

UCI

Graduate Division Graduate InterConnect (GIC) Program. 18 first-year international graduate students.	2021 - Present
School of Social Sciences Cascading Mentorship Program. 6 Cognitive Sciences Ph.D. students.	2021 - Present
CNLM Summer Journal Club Mentorship Program. 4 high school students	2020 Summer
Irvine Brain Bee. 3 high school students.	2020 Winter
Spatial Neuroscience Lab. undergraduate student researchers (2 students/year)	2019 - Present

UCSB

Summer Research Mentorship Program (RMP). 1 high school student	2018 Summer
Women in STEM Mentorship Program. 1 STEM major female undergraduate student.	2017 - 2018
Spatial Neuroscience Lab. undergraduate student researchers (1 student/year)	2017 - 2019

Other

Científico Latino's Graduate Student Mentorship Initiative. 1 underrepresented undergraduate student.	2020 Fall
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LEADERSHIP & OUTREACH

Ambassador Program Adult Outreach Committee Co-Chair	Oct. 2019 – Present
<i>UCI Center for Neurobiology of Learning and Memory (CNLM)</i>	<i>Irvine, CA</i>
<ul style="list-style-type: none">Promote “Health and Education” lectures on aging, lifestyle, and the brain toward Irvine senior communityHosted panels on “sleep and mental health” and “addiction and mental health” toward Irvine community	
Augmented Reality Sandbox Operator	Jan. 2019 – Sept. 2019
<i>Department of Geography, UCSB</i>	<i>Santa Barbara, CA</i>
<ul style="list-style-type: none">Displayed augmented reality sandbox during departmental outreach events to a various of audience including k-12 students, undergraduate students and their parents, graduate students, and faculty	
Geography Outreach Group Member	Sept. 2017 – Sept. 2019
<i>Department of Geography, UCSB</i>	<i>Santa Barbara, CA</i>
<ul style="list-style-type: none">Organized Geography Awareness Week: connect graduate students and professors from UCSB to give geography-related lectures to local K-12 schoolsOrganized geography outreach classes on remote sensing at Tech Savvy: teaching girls in grades six through nine to explore STEM education and related careersPromoted Annual Geography Trivia Night	

RELEVANT INTERNSHIPS

Data Science Instructor for Guided Projects	Aug. 2020 – Present
<i>Coursera Inc.</i>	<i>Remote</i>
<ul style="list-style-type: none">Create hands-on data science courses in R and Python with global learnersPublished data science instructor on Coursera <i>You (Lilian) Cheng</i>	
Teaching Assistant	June 2020 – July 2020
<i>Neuromatch Academy Inc. - a worldwide online computational neuroscience summer school</i>	<i>Remote</i>
<ul style="list-style-type: none">Provided feedback to evaluate and improve course material as a pre-pod memberTaught 10 students across the world online about applying computational methods (e.g., general linear model, dimensionality reduction, dynamic systems, etc.) to neuroscience research using python	
Data Science Intern	June 2019 – Sept. 2019
<i>National Center for Ecological Analysis and Synthesis (NCEAS)</i>	<i>Santa Barbara, CA</i>
<ul style="list-style-type: none">Conducted network analyses on publication and citation over 4 decades in 28 national research sites by extracting data from API (crossref) using R and PythonHosted 3 workshops to diverse groups on learning newly developed R functions	
Instructor in Psychology	Sept. 2013 – Nov. 2013
<i>Guangzhou 10th Middle School</i>	<i>Guangzhou, China</i>
<ul style="list-style-type: none">Taught psychology to two eighth-grade classesCounseled middle school students on issues on anxiety and high school entrance examinationOrganized Psychology Activity Month, including two group training for students from seventh and eighth grades	

RELEVANT SKILLS

Quantitative Skills: Mathematical Statistics & Probability, Psychology Measurement & Statistics, Big Data Analysis, Discrete Mathematics, Machine Learning, Neural Networks, Linear Algebra, Time Series, Spatial Analysis, Network Analysis, Cognitive Robotics, Statistics in fMRI Data Analysis, Text Mining, Reinforcement Learning
Brain Analysis Technology: fMRI (FSL, AFNI, SPM, Jupyter Notebook), ERP (Brain Voyager), tDCS
Robot Simulation Technology: Webots (Python, MATLAB, C)
Virtual Reality Technology: World Vizard, Sketch Up, Blender, 3D Max
Spatial Analysis Technology: ArcGIS
Web Design Skills: Wordpress, Drupal, CSS, R, Jupyter Notebook, Github
Online Teaching Skills: Zoom, Yuja, Rhyme
Programming Skills: Python, Spark (SparkR, PySpark), MATLAB, R, SQL, SDL (Presentation), E-Basic (E-Prime), PsychoPy, LaTeX
Statistics Skills: R, SPSS
Language Skills: Mandarin (native), English (fluent), Cantonese (conversational), Spanish (entry)

SELECT TRAININGS & CERTIFICATIONS

Modeling & Computing

2021 Neurohackademy Summer School. *eScience Institute, University of Washington*
2021 Digital Scholarship Services Version Control with Git Workshop and Certification. *Virtual, UCI Library*
2021 Digital Scholarship Services Unix Workshop and Certification. *Virtual, UCI Library*
2020 3rd Robot Learning Workshop: Grounding Machine Learning Development in the Real World. *Virtual, Conference on Neural Information Processing Systems (NeurIPS)*
2020 Spiking Neural Networks Workshop, “Spiking Neural Networks as Universal Function Approximators: Learning Algorithms and Applications”. *Virtual, Dan Goodman & Friedemann Zenke*

Data Science & Statistics

2020 Visualizing Science with Ramin Rahni, PhD - Boot Camp and Certification. *Virtual, Biosci & GPS-STEM, UCI*
2020 Data Science Workshop, “Data Science for Social Good (DS4SG)”. *Virtual, Georgia Tech Univ.*
2020 Statistics Workshop, “Beyond Statistical Significance: Finding Meaningful Effects”. *Virtual, NIH*
2019 Statistics Summer School, Methods University. *UCSB*
2018 Statistics Summer School, Methods University. *UCSB*
2018 Statistics Workshop, “Bren Quantitative Workshop”. *UCSB*

Public Speaking & Science Communication

2021 Communicating Science Conference for Graduate Students (ComSciCon). *Virtual, ComSciCon-LA*
2021 Industry Insights for STEM Scientists Program and Certification. *Virtual, UCI-GPS STEM*
2020 Public Speaking Program and Certification by Activate to Captivate. *Virtual, Graduate Division, UCI*
2020 Science Communication Skills for STEM Scientists - Boot Camp. *Virtual, UCI-GPS STEM*
2020 Science Communication Workshop, “The Fundamentals of SciComm”. *Virtual, Scientistt Team*

Psychology & Neuroscience

2020 Oxford Autumn School in Neuroscience. *Virtual, University of Oxford*
2019 Object Perception, Attention, and Memory Anniversary Workshop. *Montreal, Quebec, Canada*
2018 Object Perception, Attention, and Memory Anniversary Workshop. *New Orleans, LA, USA*
2013 Psychology Summer School. *Department of Psychology, Peking University (1 of 37 selected nationally)*
2013 Psychology Summer School. *Institute of Psychology, Chinese Academy of Sciences (1 of 50 selected nationally) (Declined)*

Virtual Reality

2018 Virtual Reality Workshop, “Virtual Environments as Geo/Spatial Labs”. *Tübingen, Germany*

2018 Virtual Reality Workshop, “Spatial Navigation Interfaces for Immersive Environments”. *Tübingen, Germany*

Academic

2021 Cascading Mentorship Certificate. *School of Social Sciences, UCI*

2021 Improv for Teaching Program and Certification by Activate to Captivate. *Graduate Division, UCI*

2020 Focus on Peer Review Certificate. *Nature Masterclasses*

2020 Mentoring Excellence Certificate. *UCI Graduate Division*

2020 Course Design Certificate. *UCI Division of Teaching Excellence and Innovation*

2020 Teaching Assistant Certificate. *Neuromatch Academy*

2014 Chinese Teacher’s License (Psychology and Education). *South China Normal University*

PROFESSIONAL MEMBERSHIPS

American Association for the Advancement of Sciences (AAAS)	2020
Cognitive Neuroscience Society	2020
Orange County R Users Group (OCRUG)	2020
Women in AI (WAI)	2020
Women in Machine Learning (WiML)	2020
R-Ladies Global	2020
Woman Techmakers	2020
UCI Graduate Professional Success in STEM (GPS-STEM)	2020
UCI Center for the Neurobiology of Learning & Memory (CNLM)	2019
Women in Cognitive Science (WiCS)	2018
Psychonomic Society	2018
R-Ladies Santa Barbara	2018
Society for Neuroscience	2015
Vision Science Society	2015