

# YOU (LILIAN) CHENG

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## AREA OF RESEARCH

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

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## EDUCATION

<b>Ph.D. Candidate, Cognitive Neuroscience</b> <i>University of California, Irvine (UCI), Irvine, CA, USA</i>	Sept. 2019 – Present
<b>M.S., Cognitive Neuroscience</b> <i>University of California, Irvine (UCI), Irvine, CA, USA</i>	Dec. 2020
<b>M.A., Geography</b> <i>University of California, Santa Barbara (UCSB), Santa Barbara, CA, USA</i>	Sept. 2019
<b>B.S., Psychology</b> <i>South China Normal University (SCNU), Guangzhou, Guangdong, China</i>	June 2014

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## 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 (\$200). *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*

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## AWARDS & HONORS

- 2021 Roger W. Russell Scholar’s Award. *Center for the Neurobiology of Learning and Memory (CNLM), UCI*
- 2021 Audience Choice Award. *Associated Graduate Students (AGS) Virtual Symposium, UCI*
- 2021 1st Place Winner of the Business Pitch Competition. *GPS STEM & Beall Applied Innovation, UCI*
- 2021 AGS Virtual Conference Grant Award. *Graduate Division, UCI*
- 2020 Trainee Professional Development Award (TPDA). *Society for Neuroscience*
- 2020 Finalist in AI4Good 2020 Hackathon. *TECHAiDE*
- 2020 Runner-Up in WaiDATATHON for Sustainable Future. *WaiACCELERATE & Women in AI (WAI)*
- 2018 Graduate Students Association Conference Travel Award. *Graduate Division, UCSB*
- 2018 Jack & Laura Dangermond Travel Scholarship Award (twice). *Department of Geography, UCSB*
- 2017 Jack & Laura Dangermond Travel Scholarship Award. *Department of Geography, UCSB*
- 2015 Marie A. Center Memorial Travel Award. *Dartmouth College*
- 2015 Neukom Travel Award. *Dartmouth College*
- 2013 Excellent Student in Academic Research. *School of Psychology, SCNU*
- 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

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- '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 PUBLICATIONS

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- 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*)
- **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

## MANUSCRIPTS IN PREP AND UNDER REVIEW

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- **Cheng, Y.**, Ling, S., Stern, C. E., Huang, A., Chrastil, E.R.. Travel Direction as a Fundamental Component of Human Navigation. (*in preparation*)

## REVIEW

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### Ad Hoc Journal Referee

- Quarterly Journal of Experimental Psychology

### Conference Proposal Referee

- 2021 Grace Hopper Celebration of Women in Computing (vGHC) - 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)

## SELECT CONFERENCE PRESENTATIONS

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### 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.**, 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 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 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

<b>Graduate Student Researcher</b> <i>Cognitive Anteater Robotics Lab, UCI</i>	Jan. 2021 – Present Irvine, CA
<ul style="list-style-type: none"> <li>• Study the artificial neural network of travel direction system in the human brain</li> <li>• Utilize computational modeling and virtual robot simulation</li> </ul>	
<b>Graduate Student Researcher</b> <i>Spatial Neuroscience Lab, UCSB &amp; UCI</i>	July 2017 – Present Santa Barbara, CA & Irvine, CA
<ul style="list-style-type: none"> <li>• Study the biological neural network of travel direction system in the human brain</li> <li>• Utilize psychophysics, virtual reality, and fMRI</li> </ul>	
<b>Graduate Student Researcher</b> <i>Social Perception Lab, Dartmouth College</i>	Sept. 2014 – July 2016 Hanover, NH
<ul style="list-style-type: none"> <li>• Researched the face recognition system in the human brain</li> </ul>	

#### 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

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### 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

- Give accumulated 4.5 h-long weekly lectures to 50 undergraduate students on in-depth general psychology topics, including learning, memory, motivation, thought processes, emotion, language, and development
- Design the content structure, assignments, discussions, exams, grading metrics, and supervise TA activities

### 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

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### UCI

Winter 2020 – Present

*Graduate Division Graduate InterConnect (GIC) Program Peer Mentor & CNLM*

Irvine, CA

- Provide guidance to first-year international graduate students in acclimate to UCI
- Supervised 4 high school students from all over the U.S. in learning research methods and making research presentations through reading journal articles related to learning and memory over 8 weeks
- Supervised 3 high school students in preparing for annual Irvine Brain Bee

### Other Universities (City University of New York)

Fall 2020

*Cientifico Latino’s Graduate Student Mentorship Initiative (GSMI)*

Remote

- Guided 1 underrepresented undergraduate student in applying for graduate program in neuroscience

### UCSB

Winter 2018 – Summer 2018

*Summer Research Mentorship Program (RMP) & Women in STEM Mentorship Program*

Santa Barbara, CA

- Supervised 1 undergraduate in setting goals and making quarterly plans for undergraduate research
- Supervised 1 high school student in fMRI data analysis, oral presentations, and academic writing

## LEADERSHIP & OUTREACH

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### Ambassador Program Adult Outreach Committee Co-Chair

Oct. 2019 – Present

*UCI Center for Neurobiology of Learning and Memory (CNLM)*

Irvine, CA

- Host panels on “sleep and mental health” and “addiction and mental health” toward Irvine adult community
- Promote “Health and Education” lectures on aging, lifestyle, and the brain toward Irvine senior community

### Augmented Reality Sandbox Operator

Jan. 2019 – Sept. 2019

*Department of Geography, UCSB*

Santa Barbara, CA

- 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

*Department of Geography, UCSB*

Santa Barbara, CA

- Organized Geography Awareness Week: connect graduate students and professors from UCSB to give geography-related lectures to local K-12 schools
- Organized geography outreach classes on remote sensing at Tech Savvy: teaching girls in grades six through nine to explore STEM education and related careers
- Promoted Annual Geography Trivia Night

## RELEVANT INTERNSHIPS

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### Data Science Instructor for Guided Projects

Aug. 2020 – Present

*Coursera Inc.*

*Remote*

- Create hands-on data science courses in R and Python with global learners
- Published data science instructor on Coursera *You (Lilian) Cheng*

### Teaching Assistant

June 2020 – July 2020

*Neuromatch Academy Inc. - a worldwide online computational neuroscience summer school*

*Remote*

- Provided feedback to evaluate and improve course material as a pre-pod member
- Taught 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

*National Center for Ecological Analysis and Synthesis (NCEAS)*

*Santa Barbara, CA*

- Conducted network analyses on publication and citation over 4 decades in 28 national research sites by extracting data from API (crossref) using R and Python
- Hosted 3 workshops to diverse groups on learning newly developed R functions

### Instructor in Psychology

Sept. 2013 – Nov. 2013

*Guangzhou 10th Middle School*

*Guangzhou, China*

- Taught psychology to two eighth-grade classes
- Counseled middle school students on issues on anxiety and high school entrance examination
- Organized Psychology Activity Month, including two group training for students from seventh and eighth grades

## RELEVANT SKILLS

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**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

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### 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**

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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