

Gabriel Riegner

CONTACT

email: gariegner@ucsd.edu phone: (323) 459 - 3484 website: griegner.github.io github: [griegner](https://github.com/griegner)

INTERESTS

Signal and image analysis, spatiotemporal modeling, high-dimensional statistics, brain imaging applications

EDUCATION

2022 - present
3.91 GPA

University of California San Diego (UCSD)
PhD in Data Science

San Diego, CA

Committee: Armin Schwartzman PhD, Bradley Voytek PhD

Selected coursework: numerical linear algebra, multiple linear regression, optimization, algorithms for data science, data science in biomedicine, data science ethics, machine learning, statistical models

2015 - 2019
3.83 GPA

University of Southern California (USC)
BA in Neuroscience (with departmental honors)

Los Angeles, CA

Committee: Assal Habibi PhD, Sarah Bottjer PhD, Irving Biederman PhD

Thesis: Recognition Memory Musical for Melody ([paper](#))

Selected coursework: cell biology and physiology, chemistry, neurobiology, systems neuroscience, cognitive neuroscience, seminar in neurobiology, research methods and statistics, python programming

2017

University of Otago
Exchange Student

New Zealand

2023

Neuromatch Academy

Remote

Summer course on neural networks, natural language processing, and reinforcement learning

2022

San Diego Super Computer Center

San Diego, CA

High performance computing training series on CUDA and MPI programming

RESEARCH

2023 - present

Graduate student researcher

UCSD

Advisors: Armin Schwartzman PhD, Samuel Davenport PhD

- **Statistics project on comparing brain maps** ([repository](#))

Developing method to estimate map-to-map similarity under spatial autocorrelation

- **Statistics project on estimating timescale maps with fMRI** ([repository](#))

Developing method to map the rate of temporal autocorrelation decay over the brain

2019 - 2022

Senior research technician

UCSD

Brain Mechanisms of Pain and Health Lab

Advisor: Fadel Zeidan PhD

- **Clinical trial on the brain mechanisms supporting chronic pain relief by meditation**

Experimental design, clinical pain testing, MRI scanner operation, brain imaging analysis, and personnel training

- **Clinical trial on the role of endogenous opioids in chronic pain relief by meditation**

Experimental design, clinical pain testing, monitoring patients during naloxone infusion, and data analysis

- **Pilot study on the brain mechanisms supporting chronic pain relief by vaporized cannabis**

Experimental design, clinical pain testing, monitoring patients during cannabis inhalation, and MRI operation

- **Pilot study on the effects of meditation during awake craniotomy surgeries**

IRB writing and collection of physiological/behavioral data alongside of team of neurosurgeons

2021 - 2022

Senior research technician

UCSD

Center for Psychedelic Research

Advisors: Fadel Zeidan PhD, Jon Dean PhD

- **Brain imaging study on psilocybin for phantom-limb pain**

Collected and analyzed psychological, qualitative pain rating, and brain imaging data

- **Undergraduate thesis on modeling recognition memory for musical melodies using signal detection theory**
 Experimental design, recruitment, data collection, data analysis, thesis writing, and committee defense
- **Effects of music training on brain, cognitive, and socioemotional development using fMRI and EEG**
 Behavioral and EEG data collection, and structural MRI analysis

SKILLS

Programming

- **Python:** NumPy, Pandas, SciPy, Matplotlib, Scikit-Learn, and PyTorch libraries
- **R:** Tidyverse libraries
- **Version Control:** Git and GitHub
- **Typesetting:** LaTeX
- **Neuroimaging:** Nilearn, FSL, BIDS, fMRIPrep, and ASLPrep softwares

Computing

- **High Performance Computing:** PBS and SLURM resource managers
- **Cloud Computing:** Amazon Web Services (AWS) S3 and EC2
- **Reproducibility:** Docker and Singularity containers

Clinical

- **MRI/EEG:** GE and Siemens scanner operation, and BrainVision bio-signal recording
- **Physiology:** Biopac bio-signal recording
- **Clinical Procedures:** quantitative sensory pain testing and straight leg raise test of nerve pain
- **CITI Certificates:** good clinical practice and biomedical research

Design

- **Software:** Adobe and Affinity for raster and vector graphics
- **Web Design:** developed websites for coastalresearchinstitute.com and douleurtx.com

PUBLICATIONS

- access papers on [google scholar](https://scholar.google.com)
- 2023 **The role of endogenous opioids in mindfulness and sham mindfulness-meditation for the direct alleviation of evoked chronic low back pain: a randomized clinical trial**
 L Khatib, J Dean, V Oliva, **G Riegner**, N Gonzalez, J Birenbaum, G Cruanes, J Miller, M Patterson, H Kim, K Chakravarthy, F Zeidan
Nature Neuropharmacology
- 2023 **Neural and psychological mechanisms in the relationship between resting breathing rate and pain**
 V Oliva, J Baumgartner, S Farris, **G Riegner**, L Khatib, Y Jung, R Coghill, F Zeidan
Mindfulness
- 2022 **Disentangling self from pain: mindfulness meditation-induced pain relief is driven by thalamic-default mode network decoupling**
G Riegner, G Posey, V Oliva, Y Jung, W Mobley, F Zeidan
PAIN
- 2022 **The effects of mindfulness-based stress reduction on trauma in victims of gun violence: a pilot study**
 L Khatib, **G Riegner**, J Dean, V Oliva, G Cruanes, B Mulligan, F Zeidan
Mindfulness
- 2020 **Neurophysiological mechanisms supporting mindfulness meditation-based pain relief: an updated review**
 A Jinich, E Garland, J Baumgartner, N Gonzalez, **G Riegner**, J Birenbaum, L Case, F Zeidan
Current Pain and Headache Reports
- in preparation **Meditation effects on multivariate fMRI-based pain signatures**
G Riegner, T Wager, F Zeidan
- ## CONFERENCES
- 2022 **Meditation reduces pain through generalized and stimulus-type-specific brain representations of negative affect**
G Riegner, J Dean, G Posey, Y Jung, T Wager, M Čeko, T Wager
Society for Neuroscience
- 2022 **I fear your pain: the role of amygdala in human empathy**
 V Oliva, **G Riegner**, L Khatib, J Dean, J Ross, C Lopez, A Allen, D Barrows, A Uvarova, M Reyes, R Fuentes, D Mosbey, W

Mobley, F Zeidan
Society for Neuroscience

2022 Mindfulness meditation reduces acutely exacerbated chronic back pain through non-opioid mechanisms
L Khatib, J Dean, N Gonzalez, V Oliva, G Riegner, et al.
Society for Neuroscience

2022 Meditation effects sensory but not extra-sensory cerebral pain signatures
G Riegner, J Dean, G Posey, V Oliva, L Khatib, Y Jung, T Wager, F Zeidan
US Association for the Study of Pain

2021 Neurofunctional connections supporting mindfulness-based pain relief
G Riegner, G Posey, V Oliva, L Khatib, J Baumgartner, R Kraft, Y Jung, F Zeidan
Society for Neuroscience

2020 Higher brain entropy predicts mindfulness meditation-based pain relief
A Jinich, G Posey, J Baumgartner, G Riegner, N Gonzalez, J Birenbaum, J Vaughan, Y Jung, R Kraft, F Zeidan
Society for Neuroscience

2020 Meditation-induced depressive mode reductions is associated with decreased connectivity between ventromedial prefrontal cortex and amygdala
L Khatib, V Oliva, G Riegner, G Posey, J Dean, J Baumgartner, R Kraft, J Birenbaum, F Zeidan
Society for Neuroscience

2020 Prefrontal cortico-thalamic regulation of pain by mindfulness meditation
G Riegner, J Baumgartner, G Posey, A Jinich, Y Jung, F Zeidan, N Gonzalez, J Birenbaum
US Association for the Study of Pain

2020 Mindfulness meditation engages newly discovered pathways for pain relief
F Zeidan, G Posey, J Baumgartner, G Riegner, N Gonzales, J Birenbaum, B Vaughan, Y Jung, R Kraft
International Association for the Study of Pain

ADVISING

2023-2024 Undergraduate Cognitive Science Honors Project: Milka Waniak
2023 - 2024 Undergraduate Brain Connectivity Project: Daphne Fabella, Daniel Zhang, Terho Koivisto, Andrew Cheng
2023 Undergraduate Brain Imaging Project: Brad Powell, Jeremy Nurning

SCHOLARSHIPS

2022 UCSD Competitive Edge Program: summer research stipend
2015 - 2019 USC Tuition Exchange Scholarship: 80% tuition covered
2017 - 2018 USC Student Research Scholarship: summer research stipend

SERVICE

2018 - 2019 Outdoor Guide at USC Outfitters Student Organization
Organized and led surfing, rock climbing, and hiking trips for groups of ~10 students