

Gabriel Riegner

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EDUCATION				
2022 - present	University of California San Diego , Halıcıoğlu Data Science Institute PhD student in Data Science	Advisor: Armin Schwartzman PhD Rotation advisors: Armin Schwartzman PhD, Brad 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 , Dornsife College of Letters, Arts, and Sciences Bachelor of Arts in Neuroscience (with departmental honors) and Cognitive Science	Advisors: Assal Habibi PhD, Sarah Bottjer PhD, Irving Biederman PhD Thesis: Recognition Memory for Melody 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 , Dunedin, New Zealand: international study			
RESEARCH	(projects ordered by level of involvement)			
2019 - 2022	Senior research technician: University of California San Diego , Brain Mechanisms of Pain and Health Lab Advisor: Fadel Zeidan PhD			
>	Clinical trial on the brain mechanisms supporting chronic pain relief by meditation NIH-funded (R01 AT009693) randomized clinical trial investigating the neural correlates of a radiculopathy-inducing straight leg raise procedure, and its modulation by meditation and active controls. Experimental design, straight leg raise procedure, qualitative pain testing, MRI scanner operation, neuroimaging quality control and analysis, and training of lab personnel.			
>	The role of thalamus in acute pain modulation by meditation NIH-funded (R00 AT008238) study on the effects of state-mindfulness vs control on thalamic activity and connectivity during evoked pain. Neuroimaging data processing, quality control, linear modeling (psychophysiologic interaction), multivariate prediction, parametric/non-parametric inference, and manuscript writing.			
>	Clinical trial on the role of endogenous opioids in meditation-based pain relief NIH-funded (R21 AT010352) randomized double-blind clinical trial on the role of endogenous opioids for chronic pain relief during mindfulness vs placebo-mindfulness. Experimental design, straight leg raise procedure, qualitative pain testing, monitoring patients during naloxone/saline infusion, supervising therapeutic interventions, and data analysis.			
>	Brain mechanisms of cannabis-induced analgesia Pilot study on the brain correlates of vaporized cannabis-induced acute and chronic pain relief. Experimental design, qualitative pain testing, MRI scanner operation, and neuroimaging analysis.			
>	The effects of meditation during awake craniotomy procedures Pilot study on the efficacy of meditation on anxiety and pain during awake craniotomy surgeries. IRB writing and collecting of physiological/behavioral data alongside a team of anesthesiologists and neurosurgeons.			
2020 - 2022	Senior research technician: University of California San Diego , Sanford Institute of Empathy and Compassion Advisors: Fadel Zeidan PhD, William Mobley MD PhD			
>	Brain mechanisms supporting empathy and compassion for observed pain Randomized trial on the behavioral and neural effects of compassion-based interventions. Experimental design, qualitative pain testing, MRI scanner operation, neuroimaging quality control and analysis,			

and training of lab personnel.

- 2021 - 2022 **Senior research technician: University of California San Diego, Psychedelics and Health Research Initiative**
Advisors: Fadel Zeidan PhD
- › **Psilocybin-assisted therapy for phantom limb pain**
Study on the behavioral and neural effects of psilocybin therapy for amputees experiencing phantom pain.
Collection and analysis of psychological, qualitative pain rating, and neuroimaging data.
- 2015 - 2019 **Research Assistant: University of Southern California, Brain and Creativity Institute, Brain and Music Lab**
Advisor: Assal Habibi PhD
- › **Undergraduate honors thesis on recognition memory for musical melodies.**
Independent research project on modeling recollection memory for 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.**
Seven-year longitudinal study tracking 80 children enrolled in music training and active control programs, using behavioral, fMRI, and EEG measures.
Behavioral and EEG data collection, and structural MRI analysis.
- SKILLS**
- programming
- › **Python:** NumPy, Pandas, SciPy, Matplotlib, Scikit-Learn, and PyTorch libraries.
› **R:** Tidyverse libraries.
› **typesetting:** LaTeX.
› **version control:** Git and GitHub.
- computing
- › **high performance computing:** PBS and SLURM resource managers.
› **reproducibility:** Docker and Singularity containers.
› **Amazon Web Services:** S3 object storage.
- neuroimaging
- › **FSL:** preprocessing, linear modeling, and parametric/non-parametric testing.
› **Nilearn:** connectivity, linear modeling, and machine learning.
› **ANTs:** brain extraction and segmentation.
› **pipelines:** BIDS, MRIQC, FMRIprep, ASLprep, and Snakemake.
- data collection
- › **MRI:** GE and Siemens scanner operation.
› **EEG:** BrainVision signal recording.
› **physiology:** Biopac signal recording.
› **questionnaires:** REDCap and NIH toolbox.
- clinical
- › **procedures:** quantitative sensory pain testing and straight leg raise test of nerve pain.
- design
- › **software:** Adobe and Affinity ([journal cover](#))
› **web design:** ([coastalresearchinstitute.com](#), [douleurtx.com](#), [griegner.github.io](#))
- PUBLICATIONS**
- 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
Neuropharmacology, Nature
- 2023 I feel your pain: higher empathy is associated with higher posterior default mode network activity
V Oliva, G Riegner, J Dean, L Khatib, A Allen, D Barrows, C Chen, R Fuentes, A Jacobson, C Lopez, D Mosbey, M Reyes, J Ross, A Uvarova, T Liu, F Zeidan
[bioRxiv](#)

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 <i>Mindfulness</i>
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 <i>PAIN</i>
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 <i>Mindfulness</i>
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 <i>Current Pain and Headache Reports</i>
in preparation	Meditation effects on multivariate fMRI-based pain signatures G Riegner , T Wager, F Zeidan
POSTERS	
2022	Mindfulness 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 <i>Society for Neuroscience</i>
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 <i>Society for Neuroscience</i>
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. <i>Society for Neuroscience</i>
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 <i>US Association for the Study of Pain</i>
2021	Neurofunctional connections supporting mindfulness-based pain relief G Riegner , G Posey, V Oliva, L Khatib, J Baumgartner, R Kraft, Y Jung, F Zeidan <i>Society for Neuroscience</i>
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 <i>Society for Neuroscience</i>
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 <i>Society for Neuroscience</i>
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 <i>US Association for the Study of Pain</i>
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 <i>International Association for the Study of Pain</i>
SCHOLARSHIPS	
2022	UCSD Competative Edge Program: summer research stipend

2015 - 2019	USC Tuition Exchange Scholarship: 80% tuition covered
2017 - 2018	USC Student Opportunities for Research Scholarship: summer research stipend
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 and Jeremy Nurdling

TRAINING	
2023	Neuromatch Academy: Deep Learning Summer Course (MLPs, CNNs, NLP, and RL models)
2022	High Performance Computing training series
2020	Neurohackademy FSL fMRI analysis course Pain Neuro journal club
2019	fMRI AFNI course (UCSD)

MEMBERSHIPS	
2020 - 2022	Society for Neuroscience Cognitive Science Society US Association for the Study of Pain

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