

# Gabriel Riegner

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<b>EDUCATION</b>				
2022 - present	<b>University of California San Diego</b> , Halıcıoğlu Data Science Institute PhD student			
	<b>Rotation advisors:</b> Armin Schwartzman PhD, Brad Voytek PhD <b>Selected coursework:</b> numerical linear algebra, multiple linear regression, optimization, algorithms for data science, data science in biomedicine, data science ethics.			
2015 - 2019 3.83 GPA	<b>University of Southern California</b> , Dornsife College of Letters, Arts, and Sciences Bachelor of Arts in Neuroscience (with departmental honors) and Cognitive Science			
	<b>Advisors:</b> Assal Habibi PhD, Sarah Bottjer PhD, Irving Biederman PhD <b>Thesis:</b> <a href="#">Recognition Memory for Melody</a> <b>Selected coursework:</b> cell biology and physiology, chemistry, neurobiology, systems neuroscience, cognitive neuroscience, seminar in neurobiology, research methods and statistics, python programming.			
2017	<b>University of Otago</b> , Dunedin, New Zealand: international study			
<b>RESEARCH</b>	(projects ordered by level of involvement)			
2019 - 2022	<b>Senior research technician: University of California San Diego</b> , <a href="#">Brain Mechanisms of Pain and Health Lab</a> <b>Advisor:</b> Fadel Zeidan PhD			
>	<b>Clinical trial on the brain mechanisms supporting chronic pain relief by meditation</b> 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.			
>	<b>The role of thalamus in acute pain modulation by meditation</b> 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.			
>	<b>Clinical trial on the role of endogenous opioids in meditation-based pain relief</b> 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.			
>	<b>Brain mechanisms of cannabis-induced analgesia</b> 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.			
>	<b>The effects of meditation during awake craniotomy procedures</b> 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	<b>Senior research technician: University of California San Diego</b> , <a href="#">Sanford Institute of Empathy and Compassion</a> <b>Advisors:</b> Fadel Zeidan PhD, William Mobley MD PhD			
>	<b>Brain mechanisms supporting empathy and compassion for observed pain</b> 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](http://coastalresearchinstitute.com), [douleurtx.com](http://douleurtx.com), [griegner.github.io](http://griegner.github.io))

## PUBLICATIONS

- 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

- › Neural and psychological mechanisms supporting the relationship between resting breathing rate and pain  
V Oliva, J Baumgartner, S Farris, **G Riegner**, L Khatib, Y Jung, R Coghill, F Zeidan
- › Meditation effects on multivariate fMRI-based pain signatures  
**G Riegner**, F Zeidan
- › The role of endogenous opioids in mindfulness-induced chronic low back pain relief as compared to sham-mindfulness meditation  
L Khatib, J Dean, **G Riegner**, V Oliva, N Gonzalez, J Birenbaum, 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  
*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*

### 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

### TRAINING

- 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.