Gabriel Riegner

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

EDUCATION

2022 - present
3.91 GPA

University of California San Diego San Diego, CA
PhD in Data Science

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 Los Angeles, CA
BA in Neuroscience (with departmental honors)

Committee: Assal Habibi PhD, Sarah Bottjer PhD, Irving Biederman PhD
Thesis: Recognition Memory for Musical Melody (link to thesis)
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** New Zealand
Exchange Student

2023 Neuromatch Academy
Summer course on neural networks, natural language processing, and reinforcement learning

2022 San Diego Super Computer Center
High performance computing training series on parallel GPU/CPU programming

RESEARCH

2023 - present **Graduate student researcher:** Halicioğlu Data Science Institute UC San Diego
Advisors: Armin Schwartzman PhD, Samuel Davenport PhD

• Research project on comparing brain maps (link to code)
Developing statistical method to estimate map-to-map similarity under spatial autocorrelation
• Research project on estimating timescale maps with functional MRI (link to code)
Developing statistical method to parameterize time decay constants on the brain's cortical surface

2019 - 2022 **Senior research technician:** Brain Mechanisms of Pain and Health Lab UC San Diego
Advisor: Fadel Zeidan PhD

• Clinical trial on the brain mechanisms supporting chronic pain relief by meditation
Experimental design, clinical pain testing, MRI scanner operation and 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 data analysis
• 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:** Center for Psychedelic Research UC San Diego
Advisors: Fadel Zeidan PhD, Jon Dean PhD

• Pilot study on the brain mechanisms of psilocybin for phantom-limb pain
Collected and analyzed psychological, qualitative pain rating, and brain imaging data

2015 - 2019 **Research technician:** Brain and Creativity Institute University of Southern California
Advisor: Assal Habibi PhD

• Undergraduate thesis on modeling recognition memory for music using signal detection theory
Experimental design, recruitment, data collection, data analysis, thesis writing, and committee defense
• Study on the effects of music training on brain, cognitive, and socioemotional development
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

UI/UX
• 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

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, et al.
Nature Neuropharmacology

2023 Neural and psychological mechanisms in the relationship between resting breathing rate and pain
V Oliva, J Baumgartner, S Farris, G Riegner, et al.
Mindfulness

2022 Disentangling self from pain: mindfulness meditation-induced pain relief is driven by thalamic-default mode network decoupling
G Riegner, et al.
PAIN

2022 The effects of mindfulness-based stress reduction on trauma in victims of gun violence: a pilot study
L Khatib, G Riegner, et al.
Mindfulness

2020 Neurophysiological mechanisms supporting mindfulness meditation–based pain relief: a review
A Jinich, E Garland, J Baumgartner, N Gonzalez, ***G Riegner***, et al.
Current Pain and Headache Reports

under review Meditation effects on multivariate fMRI-based pain signatures
G Riegner, et al.

CONFERENCES

2022 Meditation reduces pain through stimulus-specific and general brain representations of negative affect
G Riegner, et al.
Society for Neuroscience

2022 I fear your pain: the role of amygdala in human empathy
V Oliva, G Riegner, et al.
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, et al.
US Association for the Study of Pain

2021 Neurofunctional connections supporting mindfulness-based pain relief
G Riegner, et al.
Society for Neuroscience

2020 Higher brain entropy predicts mindfulness meditation-based pain relief
A Jinich, G Posey, J Baumgartner, G Riegner, et al.
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, et al.
Society for Neuroscience

2020 Prefrontal cortico-thalamic regulation of pain by mindfulness meditation
G Riegner, et al,.
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, et al.
International Association for the Study of Pain

ADVISING

2023-2024 Undergraduate Honors Project: Milka Waniak
2023 - 2024 Undergraduate Capstone Project: Daphne Fabella, Daniel Zhang, Terho Koivisto, Andrew Cheng (website)
2023 Undergraduate Capstone Project: Brad Powell, Jeremy Nurding (website)

SCHOLARSHIP

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