DANIEL L. GONZALES, PHD

HHMI HANNA GRAY FELLOW
PURDUE UNIVERSITY
WELDON SCHOOL OF BIOMEDICAL ENGINEERING

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EDUCATION

Doctor of Philosophy and Master of Science, Applied Physics
Rice University, 2013-2019

Bachelor of Science, Physics
Angelo State University, summa cum laude, 2009-2013

RESEARCH BACKGROUND

Postdoctoral Fellow
2019-Present

Nano-Neurotechnology Lab | Weldon School of Biomedical Engineering
Purdue University
My research focuses on developing nanoscale tools for recording neural cellular and subcellular activity from the cortical surface. These scalable, flexible, and transparent technologies provide new insights into how network-level computations and body-wide behaviors emerge from subcellular computations.
Mentor: Krishna Jayant, PhD

Doctoral Fellow
2013-2019

Robinson Lab | Department of Electrical and Computer Engineering
Rice University
For my PhD work I developed nano-SPEARs (nanoscale, suspended electrode arrays) integrated into microfluidic channels for scalable electrophysiology in microscopic animals. This technology led to our discovery of a microfluidic-induced *C. elegans* sleep state, which we demonstrated is an advantageous behavior for studying the neural circuits driving brain and behavioral state transitions.
Mentor: Jacob T. Robinson, PhD

Undergraduate Research Fellow
Angelo State University
2010-2013

Atomic Physics Laboratory | Department of Physics and Geosciences
Angelo State University
During my undergraduate training I studied the spectra of a number of different radiation sources, such as the angular dependence of thick-target bremsstrahlung and the spectra emitted by carbon nanotubes in a microwave field. We also collaborated with the JJ Pickle Research Campus at the University of Texas to use neutron activation analysis to study the molecular content of various motor oils.
Mentor: Scott Williams, PhD

NASA Science and Technology Institute Research Assistant
Summer 2011

Bioscience and Technology Branch | NASA John Glenn Research Center
I studied the properties of various metal catalysts to maximize the output of clean, non-petroleum jet fuel using the Fischer-Tropsch process.
Mentor: Ana de la Ree, PhD

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FUNDING, FELLOWSHIPS, SCHOLARSHIPS

2024-2028 **Howard Hughes Medical Institute** Hanna Gray Fellowship Faculty Phase (About)
Role: Principal Investigator
$250K/yr for 4yr (research). $20K/yr flex fund

2021-2024 **Burroughs Wellcome Fund** Postdoctoral Enrichment Program (About)
Role: Postdoctoral Fellow
$20K/yr for 3yr (research and professional development)

2020-2024 **Howard Hughes Medical Institute** Hanna Gray Fellowship Postdoc Phase (About)
Role: Postdoctoral Fellow
$70K/yr for 4 yr (salary). $20K/yr flex fund

2019 (early finish) **Purdue College of Engineering** Lillian Gilbreth Fellowship (About)
Role: Postdoctoral Fellow
$60K/yr for 2 yr (salary). $5K travel fund

2014-2019 **NSF** Graduate Research Fellowship (About)
Role: Graduate Fellow

2017 **Rice University** Student Training for Advising Research Program (About)
Role: Principal Investigator

2014-2016 **NSF IGERT** Neuroengineering from Cells to Systems (About)
Role: Graduate Trainee

2012-2013 **Angelo State University** Undergraduate Research Fellowship (About)
Role: Undergraduate Research Fellow

2009-2013 **Angelo State University** First Generation Scholarship
Role: Undergraduate Student

AWARDS AND HONORS

2020 **CellPress** 100 Inspiring Hispanic/Latinx Scientists (About)

2018 **Rice University Smalley-Curl Institute** Transdisciplinary Symposium Best Presentation (About)

2016 **Rice University Electrical Engineering** Best PhD Presenter Award

JOURNAL PUBLICATIONS

D.L. Gonzales, K.N. Badhiwala, B.W. Avants, J.T. Robinson, "Bioelectronic interfaces to millimeter-sized model organisms," ***iScience*** (2020).

D.L. Gonzales, J. Zhou, B. Fan, J.T. Robinson, "A microfluidic-induced *C. elegans* sleep state," ***Nature Communications*** (2019).

K.N. Badhiwala, D.L. Gonzales, D.G. Vercosa, B.W. Avants, Z. Liu, W. Zhong, J.T. Robinson, "Microfluidics for electrophysiology, imaging, and behavioral analysis of *Hydra*," ***Lab on a Chip*** (2018).

D.L. Gonzales, K.N. Badhiwala, D.G. Vercosa, B.W. Avants, Z. Liu, W. Zhong, J.T. Robinson, "Scalable electrophysiology in intact small animals with nanoscale suspended electrode arrays." ***Nature Nanotechnology*** (2017).

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S. Ferguson, J. Johnson, D. Gonzales, C. Hobbs, C. Allen, S. Williams, "Analysis of ZDDP content and thermal decomposition in motor oils using NAA an NMR" ***Physics Procedia*** (2015).

D. Gonzales, S. Williams, "Angular distribution of bremsstrahlung produced by 10-keV and 20-keV electrons incident on a thick Au target," ***AIP Conference Proceedings*** (2013).

S. Ferguson, N. McGara, B.S. Cavness, D. Gonzales, S. Williams, "Spectra of radiation emitted by single-walled and multi-walled carbon nanotubes during multiple microwave irradiation and cooling cycles," ***International Journal of Nanoscience and Nanotechnology*** (2013).

D. Gonzales, B. Cavness, S. Williams, "Angular distribution of thick-target bremsstrahlung produced by electrons with initial energies ranging from 10 to 20-keV incident on Ag," ***Physical Review A*** (2011).

D. Gonzales, S. Requena, S. Williams, "Au Lα x-rays induced by photons from ^{241}Am: comparison of experimental results and the predictions of PENELOPE," ***Applied Radiation and Isotopes*** (2011).

D. Gonzales, S. Requena, S. Davis, S. Williams, "Angular distribution of K-shell X-rays produced by 29 keV electrons incident on Ag," ***Nuclear Instruments and Methods in Physics Research Sect. B*** (2011).

S. Requena, D. Gonzales, S. Williams, "Angular dependence of bremsstrahlung produced by 17.5-keV electrons incident on thick Ag," ***Physical Review A*** (2011).

PRESENTATIONS

Virtual Poster, "Mapping sensory-driven activity from the cortical surface," *HHMI Cognitive and Systems Neuroscience Meeting* (October 2021).

Virtual Poster, "Nano- and micro-scale technologies for mapping sensory-driven activity from the brain surface," *Burroughs Wellcome Fund New Awardee Annual Meeting* (October 2021).

Invited Seminar, "Nano- and micro-scale technologies for mapping sensory-driven activity from the brain surface," *Penn State Center for Neural Engineering Seminar* (September 2021).

Invited Seminar, "Flexible micro- and nano-scale technologies for mapping neural activity from the brain surface," *Purdue Psychology Colloquium* (September 2021).

Invited Virtual Seminar, "Nano and microscale technologies for mapping subcellular activity," *Big 10 Neuroscience Seminar Series* (May 2021).

Invited Virtual Seminar, "Mapping subcellular activity from the surface of the brain," *Philadelphia SPINE (Symposium for Postdoctoral Initiatives in Neuroscience Excellence)* (May 2021).

Invited Virtual Seminar, "Scalable technologies for mapping subcellular neural activity," *Imperial College London Virtual Seminars in Biomedical Science*, London, England (April 2021).

Invited Virtual Seminar, "Nanoscience, Neuroscience, Briskets: A Journey Through Academia," *University of North Texas Health Science Center Diversity Seminar Series*, Fort Worth, TX (January 2021).

Invited Virtual Seminar, "Scalable technologies for mapping subcellular neural activity," *Princeton Rising Stars in Biological Engineering Seminar Series*, Princeton, NJ (December 2020).

Invited Virtual Seminar, "From nano to neuro: my journey through science," *Bard College Bioseminar*, Annandale-on-Hudson, NY (December 2020).

Virtual Poster, "Path towards mapping subcellular activity from the surface of the brain," *HHMI Virtual Science Meeting - Cognitive and Systems Neuroscience*, Chevy Chase, MD (December 2020).

Virtual Talk, "Path towards scalable recordings of subcellular cortical activity during behavior and learning," *Janelia Junior Scientist Virtual Workshop on Mechanistic Cognitive Neuroscience*, Ashburn, VA (November 2020).

Virtual Talk, "Scalable recordings of subcellular cortical computations from the surface of the brain," *Boston University Biomedical Engineering Emerging Scholars Symposium*, Boston, MA (October 2020).

Virtual Talk, "Path towards mapping subcellular activity from the surface of the brain," *Rosalind Franklin University of Medicine and Science Neuroscience Research Symposium*, Chicago, IL (July 2020).

Invited Seminar, "Nanoscale brain-machine interfaces," *Angelo State University*, San Angelo, TX (November 2019).

Talk, "The Nano-Needle Net: An electrode array for nanoscale neuroscience," *Hanna Gray Fellowship Orientation,* Janelia Research Campus, Ashburn, VA (October 2019).

Semifinalist Talk, "The Nano-Needle Net: A nanoelectrode array for dendritic recordings," *Hanna Gray Fellowship Semifinalist Round,* HHMI Headquarters, Chevy Chase, MD (June 2019).

Dynamic poster, "Multiple sensory inputs modulate a short-lived sleep-like state in *C. elegans*," *Society for Neuroscience Annual Meeting*, San Diego, CA (November 2018).

Poster, "Multiple sensory inputs modulate a short-lived sleep-like state in *C. elegans*", *Gulf Coast Consortia Cluster for Neuroengineering Annual Meeting*, Houston, TX (October 2018).

Poster, "Multiple sensory inputs modulate a short-lived sleep-like state in *C. elegans*," *C. elegans Topic Meeting: Neuronal Development, Synaptic Function and Behavior*, Madison, WI (June 2018).

Talk, "Whole-brain imaging of spontaneous sleep-wake transitions," *Smalley-Curl Institute Transdisciplinary Symposium*, Houston, TX (February 2018). Awarded travel funds for best presentation.

Invited talk, "Whole-brain imaging of spontaneous behavioral state transitions," *Gulf Coast Consortia Keck Research Conference*, Houston, TX (November 2017).

Poster, "Distinct *C. elegans* behavioral states in a microfluidic environment," *International C. elegans Conference*, Los Angeles, CA (June 2017).

Poster, "Versatile electrophysiological phenotyping of *C. elegans*", *Society for Neuroscience Annual Meeting*, San Diego, CA (November 2016).

Invited talk, "A nanoelectronic interface for microscopic worms", *Rice University Electrical and Computer Engineering Corporate Affiliates Day*, Houston, TX (April 2016). Invited talk for best PhD presenter award.

Poster, "Suspended nano-electrodes for neuromuscular electrophysiology in *C. elegans*", *Gulf Coast Consortia Theoretical and Computational Neuroscience Conference*, Houston, TX (February 2016).

Talk, "High-throughput electrophysiological phenotyping of *C. elegans* using suspended nano-electrodes", *Society for Neuroscience Annual Meeting*, Chicago, IL (October 2015).

Poster, "Nanoscale electrophysiology in small organisms", *Gulf Coast Consortia Cluster for Neuroengineering Annual Meeting*, Houston, TX (October 2015).

Poster, "Nanoscale suspended electrode arrays for studying diseases in small organisms", *Rice Smalley-Curl Institute Annual Colloquium*, Houston, TX (August 2015).

Talk, "Nano-electrode recordings in intact *C. elegans* reveal phenotypes for neurological disease models", *C. elegans International Meeting*, Los Angelos, CA (June 2015).

Invited Seminar, "Nanodevices for the *in vivo* measurement of electrophysiology in small organisms", *Society of Physics Students Angelo State University Chapter*, San Angelo, TX (March 2015).

Poster, "Small organism electrophysiology on a chip", *Annual UTHealth Neuroscience Poster Session*, Houston, TX (December 2014).

Poster, "Whole organism electrophysiology on-chip", *Keck Annual Research Conference*, Houston, TX (November 2014).

Talk, "On-chip electrophysiological phenotyping of intact *C. elegans*", *Gulf Coast Consortia Cluster for Neuroengineering Annual Meeting*, Houston, TX (October 2014). Abstract selected as a trainee talk.

Talk, "Nanowire electrophysiology for the *in vivo* measurement of the *C. elegans* neuromuscular junction", Biomedical Engineering Society Annual Meeting, San Antonio, TX (October 2014).

Talk, "Nanowire electrophysiology in intact *C. elegans* at the neuromuscular junction", *Annual Rice Quantum Institute Research Symposium*, Houston, TX (August 2014).

Poster, "Angular distribution of bremsstrahlung produced by 10-keV and 20-keV electrons incident on a thick Au target", *Angelo State University's Undergraduate Research Symposium*, San Angelo, TX April (2013).

Poster, "Angular distribution of bremsstrahlung produced by 10-keV and 20-keV electrons incident on a thick Au target", *Sigma Pi Sigma Quadrennial Physics Conference*, Orlanda, FL (November 2012).

Talk, "Angular distribution of bremsstrahlung produced by 10-keV and 20-keV electrons incident on a thick Au target", *Angelo State University Society of Physics Students Chapter*, San Angelo, TX (October 2012).

Poster, "Angular distribution of bremsstrahlung produced by 10-keV and 20-keV electrons incident on a thick Au target," *Conference on the Applications of Accelerators in Research and Industry*, Fort Worth, TX (August 2012).

Poster, "Angular distribution of thick-target bremsstrahlung produced by electrons with initial energies ranging from 10 to 20-keV incident on Ag", *Angelo State University's Undergraduate Research Symposium*, San Angelo, TX (April 2011).

Poster, "Angular distribution of thick-target bremsstrahlung produced by electrons with initial energies ranging from 10 to 20-keV incident on Ag", *Texas Section APS/AAPT/SPS Joint Meeting*, San Angelo, TX (March 2011).

Talk, "Catalyst Analysis for the Fisher-Tropsch Process", *Angelo State University Society of Physics Students Chapter*, San Angelo, TX (September 2011).

Poster, "Catalyst Analysis for the Fischer-Tropsch Process", *Historically Black Colleges and Universities and The Ohio Aerospace Institute Collaboration Symposium*, Cleveland, OH (July 2011).

SERVICE

2021	**Mentor to grad students**, Purdue Biomedical Engineering Mentor/Mentee Program
2021-2022	**Liaison,** Hanna Gray Fellow Liaison to HHMI Leadership
2021	**Invited Panelist**, The National Academies: Neuroscience Training in Challenging Times (About)
2020	**Contributor**, 1000 Inspiring Black Scientists (About)
2020	**Invited Panelist**, Rice Neuroengineering Initiative Alumni Panel
2020	**Judge**, Black in Neuro Conference 2020
2020	**Organizer**, Neuromatch 3.0 Special Session: Stories from First Generation Scholars
2018	**Scribe**, IEEE Brain Think Tank: Closed-Loop Control of Neural Activity (About)
2018	**Scribe**, COSYNE Workshop: Closed-Loop Control of Neural Systems and Circuits
2013-2017	**Officer/Vice President**, Rice University Applied Physics Graduate Student Association
2015-2017	**Mentor to first year grad students**, Rice University Electrical and Computer Engineering
2016	**Speaker**, Rice University Athletics Annual Student Leadership Conference
2016	**Judge**, Western Academy Middle School Science and Natural History Fair
2015	**Judge**, Science and Engineering Fair of Houston

TEACHING EXPERIENCE

Spring/Fall 2018	**TA - Engineering Design and Communication** Rice University School of Engineering
Spring 2016	**TA - Oral Communication for Engineering Leaders** **TA - Writing Skills for Engineering Leaders** Rice University Center for Engineering Leadership
Fall 2016	**TA – Intro to Spatial Visualization** Rice University School of Engineering
Fall 2015	**TA – Intro to Neuroengineering** Rice University Department of Electrical and Computer Engineering
Spring 2014	**TA – Physics Lab II** Rice University Department of Physics and Astronomy
Spring 2013	**TA – Business Math** **TA – Calculus I** Angelo State University Department of Mathematics

PATENTS

Suspended nano-electrodes for on-chip electrophysiology United States 14/939,384 Filed: 2015

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