Cristina Rodríguez, PhD

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EDUCATION

Postdoctoral training	**University of California, Berkeley** Funded by the Burroughs Wellcome Fund Career Awards at the Scientific Interface (CASI)	2018-present
	HHMI Janelia Research Campus	2016-2018
PhD Physics	**The University of New Mexico** GPA: 4.11/4.20 Thesis: *Third-harmonic generation for efficient frequency conversion and microscopic imaging*	2007-2015
Licentiate Physics	**Universidad Simón Bolívar. Caracas, Venezuela** GPA: 4.92/5 (summa cum laude, first of the February 2007 class)	2001-2007
	The University of New Mexico (Education abroad program)	2005-2006

RESEARCH EXPERIENCE

Postdoctoral scholar — **University of California, Berkeley** — 2018-present
Department of Physics, Department of Molecular and Cell Biology
Supervisor: Na Ji

- Demonstrated adaptive optical three-photon imaging of neuronal structures and activity in the mouse spinal cord, at unprecedented depths (with Prof. Xiaoke Chen, Stanford University)
- Developed adaptive optics standalone application for multiphoton microscopes

Spinal cord work funded by the Burroughs Wellcome Fund CASI, 2 publications

HHMI Janelia Research Campus — 2016-2018
Supervisor: Na Ji

- Designed and built adaptive optical three-photon microscope and applied it for synaptic resolution imaging in deep layers of the mouse brain
- Implemented Bessel beam three-photon microscopy for in vivo brain imaging

This work resulted in 2 publications and 1 book chapter

Graduate researcher — **The University of New Mexico** — 2008-2015
Department of Physics and Astronomy
Supervisor: Wolfgang Rudolph

- Co-invented frequency tripling mirror based on efficient third-harmonic generation
- Modeled third-harmonic generation from layered materials
- Developed imaging method for detecting anisotropies on dielectric thin films
- Demonstrated optical approach for characterizing femtosecond laser-induced plasmas

This work resulted in 1 patent and 5 publications

Graduate and undergraduate researcher — **The University of New Mexico** — 2006-2009
Department of Physics and Astronomy
Supervisor: Gregory Taylor

- Performed image reconstruction and analysis of radio astronomical observations of a galaxy hosting a supermassive binary black hole system at its center

This work resulted in 3 publications

AWARDS & HONORS

Burroughs Wellcome Fund Career Awards at the Scientific Interface ($500,000) — 2020-2025
► Title: *Decoding spinal cord neural circuits through advanced optical imaging methods*

Travel grant award, The University of New Mexico — 2012 & 2015

American Association of Physics Teachers award for outstanding TA's — 2008

PUBLICATIONS

- **Rodríguez, C.**, Chen, A., Rivera, J. A., Mohr, M. A., Liang, Y., Natan, R., Sun, W., Milkie, D. E., Bifano, T. G., Chen, X., Ji, N.: An adaptive optics module for deep tissue multiphoton imaging in vivo (accepted in *Nature Methods*, October 2021 issue). Preprint available at bioRxiv 2020.11.25.397968 — 2021
- **Rodríguez, C.**, and Ji, N.: One wavelength to excite them all: deep tissue imaging going multicolor, *Trends in Neurosciences*, 44, 689 — 2021
- **Rodríguez, C.** and Ji, N.: Zonal Adaptive Optical Microscopy for Deep Tissue Imaging, *Book chapter* in Wavefront Shaping for Biomedical Imaging, 92. In Press (Cambridge University Press)
- **Rodríguez, C.**, and Ji, N.: Adaptive optical microscopy for neurobiology, *Current Opinion in Neurobiology*, 50, 83 — 2018
- **Rodríguez, C.**, Liang, Y., Lu, R., and Ji, N.: Three-photon fluorescence microscopy with an axially elongated Bessel focus, *Optics Letter*, 43, 1914 — 2018
- **Rodríguez, C.** and Rudolph, W.: Frequency tripling mirror, *Optics Express*, 23, 31594 — 2015
- **Rodríguez, C.** and Rudolph, W.: Modeling third-harmonic generation from layered materials using nonlinear optical matrices, *Optics Express*, 22, 25984 — 2014
- **Rodríguez, C.** and Rudolph, W.: Characterization and $\chi^{(3)}$ measurements of thin films by third-harmonic microscopy. *Optics Letters*, 39, 6042 — 2014
- Weber, R. A., **Rodríguez, C.**, Nguyen, D. N., Emmert, L. A., and Rudolph, W: Third harmonic microscopy of intrinsic and induced material anisotropy in dielectric thin films, *Optical Engineering*, 51, 121807 — 2012
- **Rodríguez, C.**, Sun, Z., Wang, Z., and Rudolph, W.: Characterization of laser-induced air plasmas by third harmonic generation, *Optics Express*, 19, 16115 — 2011
- **Rodríguez, C.**, Taylor, G. B., Zavala, R. T., Pihlström, Y. M., and Peck, A. B.: HI Observations of the Supermassive Binary Black Hole System in 0402+379, *Astrophysical Journal*, 697, 37 — 2009
- Gentile, G., **Rodríguez, C.**, Taylor, G. B., Giovannini, G., Allen, S. W., Lane, W. M., and Kassim, N. E.: Monitoring the Bi-Directional Relativistic Jets of the Radio Galaxy 3C338, *Astrophysical Journal*, 659, 225 — 2007
- **Rodríguez, C.**, Taylor, G. B., Zavala, R. T., Peck, A. B., Pollack, L. K., and Romani, R. W.: A Compact Supermassive Binary Black Hole System, *Astrophysical Journal*, 646, 49 — 2006

PATENTS

Rudolph, W. and **Rodríguez, C**. Harmonic generation using optimized stacks of thin films. U.S. Patent 9880445 — 2017

SELECTED PRESENTATIONS

Seminar: Allen Institute for Brain Science
► Talk title*: Next-generation optical imaging methods for probing the brain and spinal cord* — 2021

7th Annual BRAIN Initiative Investigators Meeting
► Poster title*: Adaptive optical three-photon microscopy for in vivo imaging of the central nervous system* — 2021

Burroughs Wellcome Fund New Awardee Networking Virtual Meeting
► Poster title*: Decoding spinal cord neural circuits with advanced optical imaging methods* — 2020

Rising Stars in Physics, Stanford University
► Talk title: *Shaping Light for Understanding the Brain* — 2019

Photonics West
► Title of talk: *An adaptive optics method for deep tissue multiphoton imaging in vivo* — 2019

Conference on Lasers and Electro Optics
► Talk title: *Thin film characterization using third harmonic generation microscopy* — 2012
► Talk title: *Characterization of laser-induced air plasmas via third harmonic generation* — 2011
► Poster title: *Infrared Stimulated Parametric Emission Microscopy* — 2009

International OSA Network of Students Conference
► Title of talk: *Third harmonic generation by a laser-induced plasma* — 2010

Southwestern Optics Student Conference
► Title of talk: *Infrared Stimulated Parametric Emission Microscopy* — 2009

PROFESSIONAL TRAINING

"Scientists Teaching Science" course, HHMI Janelia Research Campus
9-week online course by STEM Education Solutions in best practices in science education — 2017

TEACHING EXPERIENCE

Teaching Assistant, The University of New Mexico — 2007-2008
Course: Astronomy 101 Laboratory

Instructor: Universidad Simón Bolívar. Caracas, Venezuela — 2007
Course: Physics I Laboratory

SERVICE & OUTREACH

Topic Editor for special issue on "Adaptive Optics for In Vivo Brain Imaging" for *Frontiers in Neuroscience*	2021
Abstract reviewer and judge for Black In Neuro Conference	2020
Science outreach volunteer (RESET), Sugarland Elementary School, Ashburn VA	2017-2018
Journal reviewer: Biomedical Optics Express, Optics Express, Applied Optics, Optics Communications	2014-present
Hiring committee student member, Physics and Astronomy Department, The University of New Mexico	2013
Volunteer at Albuquerque Mountain Rescue Council	2009-2015