

# Jessica Ramirez

RESEARCH SCIENTIST · OPTICAL MANUFACTURING ENGINEER · ROPE ACCESS TECHNICIAN

Oklahoma City, OK, USA

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*"Highly skilled researcher and scientist with a background in laser technology, materials science, computational quantum chemistry and data analysis."*

## Education

### University of Colorado

Boulder, CO

PH.D. IN PHYSICAL CHEMISTRY

Aug. 2011 - Dec. 2017

- GPA: 3.86/4.00
- Thesis: Charge Generation and Recombination in Materials for Organic Photovoltaics
- Advisor: Dr. Garry Rumbles

### University of Oregon

Corvallis, OR

B.S. IN COMPUTER SCIENCE (IN PROGRESS, EXPECTED 2026)

May 2024 - Present

- GPA: 4.00/4.00
- Currently performing research with Dr. Tim Zuehlisdoerff

### University of Florida

Gainesville, FL

B.S. IN CHEMISTRY, *Summa Cum Laude*

May 2007 - Dec. 2010

- GPA: 3.98/4.00
- Thesis: Modifying the Opto-Electronic Properties of Crystalline and Amorphous Semi-Conducting Silicon Surfaces via Absorptive Ag<sub>n</sub> Functionalization
- Advisor: Dr. David Micha

## Skills

### Optical Engineering

Laser alignment, Microscopy, Optical fiber technology, Optical design, Zemax OpticStudio

### Laser Technology

Ultrashort pulse generation, Laser system characterization, Optical metrology, Laser Safety

### Programming

Python, JavaScript, Bash, Perl, FORTRAN, PBS, SQL

### Scientific Software

SolidWorks, Matlab, Mathematica, Origin, Igor, Gaussian, VASP

### Data Analysis

NumPy, Pandas, SciPy, Matplotlib, Seaborn, Scikit-learn, Statsmodels, OpenCV, Fiji, MATLAB

### Characterization

Spectroscopy, Polarimetry, Time-Related Single Photon Counting, Microwave Conductivity, X-Ray Diffraction

### Operating Systems

Windows, Unix, Linux

## Experience

### Access Optics

Broken Arrow, OK

OPTICAL MANUFACTURING ENGINEER

Feb 2023 - Present

- Managed multiple engineering and R&D programs, including laser alignment of micro-assemblies for fluorescence microscopy, precision slumping of glass for surgical equipment, and miniature camera systems development.
- Established and maintained laser safety program as Certified Laser Safety Officer.
- Developed work instructions, process/equipment validations, risk management plans and engineering drawings in compliance with ISO 13485 and ASME Y14.5 GD&T standards.
- Utilized SolidWorks and SLA/PLA 3D printing to design mechanical housings and custom fixturing for manufacturing and optical alignment of prototype devices.
- Developed Python codes for quantitative image analysis and automation of tasks related to optical modeling and prototyping.
- Used Zemax optical design software for verification of performance and metrics of interest.

### Rope Partner

Santa Cruz, CA

LEAD ROPE ACCESS TECHNICIAN

Mar 2021 - May 2024

- Led rope access teams to lock-out, inspect, rig rope systems and rappel or climb to areas of work on damaged wind turbines in the field
- Perform various repair and maintenance tasks at heights on wind turbines, including: blade additions, leading edge protection, lightning protection system testing, confined space entry and composite repairs involving epoxy resin and fiberglass sandwich structure repairs using wet and dry layups with and without vacuum and thermal cycling.
- Helped train new technicians on performing rope access work in the field. Helped onboard new processes and equipment by developing safe processes for integration into rope access wind turbine work through experimentation and documentation.

## Thorlabs: Laser Division

Boulder, CO

DESIGN ENGINEER

Oct 2019 - Mar 2020

- Played key role in transitioning start-up company (KM Labs) through an acquisition process.
- Helped plan carbon-nanotube based oscillator program: including material acquisition, experimental design, initial prototype design and testing.

## Kapteyn-Murnane Laboratories

Boulder, CO

RESEARCH SCIENTIST

May 2018 - Oct 2019

- Contributed to three SBIR Phase II grants with proposal writing, grant capture, budget planning and patenting of intellectual property.
- Ensured execution of grant deliverables and documented progress through preparation of technical reports while complying with ITAR regulations.
- Assisted in design and build of fiber-based laser systems for ultrashort pulse generation in VUV, visible and NIR spectra.
- Prepared and assembled optical fiber components, including connectorization, fiber tip polishing, splicing, and recoating of various fiber types.
- Assisted in building a direct-diode pumped, cryogenically cooled Titanium-Sapphire amplifier.
- Characterized laser systems using frequency-resolved optical gating, power and spectral monitoring, oscilloscopes, RF signal analyzers, and various other tools.

## National Renewable Energy Laboratory

Golden, CO

RESEARCH ASSISTANT

Jan 2012 - Dec 2017

- Utilized various spectroscopic techniques to study and characterize organic charge-generating materials of interest.
- Prepared and studied polymer/small-molecule thin films, as well as solution samples, using drop-casting and spin-coating techniques.
- Maintained laboratory equipment including glovebox and pump systems, managed chemical inventory, and ensured proper disposal of chemical waste.
- Built and maintained fluorescence characterization systems.

## Center for Non-Linear Studies, Los Alamos National Laboratory

Los Alamos, NM

RESEARCH ASSISTANT

Feb 2009 - Aug 2011

- Performed computational quantum chemical calculations on organic systems, including carbon nanotubes, fullerenes and small organic dyes.
- Collaborated with experimentalists to determine most relevant theoretical methodologies and modes of inquiry to optimize experimental design.
- Disseminated results through publications, conference attendance, talks and poster presentations.
- Won Best Poster Award at Annual Student Research Symposium (2009) for "Electronic Structure of Functionalized Semiconductor Nanotubes."

## Quantum Theory Project, University of Florida

Gainesville, FL

RESEARCH ASSISTANT

Aug 2007 - Dec 2010

- Performed computational quantum chemical calculations on inorganic Silicon systems, focusing on how doping alters electronic structure and optical properties.
- Executed scripts within Unix environment to submit and analyze quantum chemical calculations via batch computation jobs through a PBS queue.
- Wrote manual used for training new students on how to perform quantum-mechanical computations using existing scripts.
- Disseminated results through publications, conferences, talks and poster presentations, domestically and abroad (Santiago, Chile).

## Certifications & Continuing Education

- 2024 **Certified Laser Safety Officer**, Access Optics
- 2024 **SolidWorks CSWP Prep Course**, GoEngineer
- 2023 **ASME Y14.5 Geometric Dimensioning and Tolerancing Design and Applications Courses**, GeoTol

## Publications

- [1] Jessica J. Ramirez, D. S. Kilin, and D. A. Micha. Optical properties of the si(111):h surface with adsorbed ag clusters. *International Journal of Quantum Chemistry*, 109:3694–3704, 2009.
- [2] T. W. Lajoie, Jessica J. Ramirez, D. S. Kilin, and D. A. Micha. Optical properties of amorphous and crystalline silicon surfaces functionalized with ag<sub>n</sub> adsorbates. *International Journal of Quantum Chemistry*, 110:3005–3014, 2010.
- [3] S. Kilina, Jessica Ramirez, and S. Tretiak. Brightening of the lowest exciton in carbon nanotubes via chemical functionalization. *Nano Letters*, 12:2306–2312, 2012.
- [4] Jessica J. Ramirez, D. S. Kilin, and D. A. Micha. Electronic structure and optical absorbance of doped amorphous silicon slabs. *International Journal of Quantum Chemistry*, 112:300–313, 2012.
- [5] Jessica Ramirez, M. L. Mayo, S. Kilina, and S. Tretiak. Electronic structure and optical spectra of semi-conducting carbon nanotubes functionalized by diazonium salts. *Chemical Physics*, 413:89–101, 2013.

- [6] Jessica J. Ramirez, J. Park, T. T. Clikeman, B. W. Larson, O. V. Boltalina, S. H. Strauss, and G. Rumbles. Variation of excited-state dynamics in trifluoromethyl functionalized c60 fullerenes. *Physical Chemistry Chemical Physics*, 18:22937–22945, 2016.
- [7] Jessica J. Ramirez. *Charge Generation and Recombination in Organic Materials for Photovoltaics*. PhD thesis, University of Colorado, Boulder, CO, 2017.
- [8] D. E. Couch, D. D. Hickstein, D. G. Winters, S. J. Backus, M. S. Kirchner, S. R. Domingue, J. Ramirez, C. G. Durfee, M. M. Murnane, and H. C. Kapteyn. Ultrafast 1 mhz vacuum-ultraviolet source via highly cascaded harmonic generation in negative-curvature hollow core fibers. *Optica*, 7:832–837, 2020.