

JOSÉ J. GARCÍA

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PROFESSIONAL SUMMARY

Ph.D. candidate in Mathematics at the University of New Mexico. Research at the intersection of linear algebra and mathematical physics, with emphasis on composite-operator methods for quantum systems, topological invariants, and non-Hermitian physics. Experienced instructor (Calculus, Linear Algebra, ODE) with a strong commitment to inclusive teaching, mentoring, and departmental service.

EDUCATION

University of New Mexico, Albuquerque, NM	<i>Expected May 2027</i>
Doctor of Philosophy in Mathematics	
Master of Science in Mathematics	<i>Graduated July 2026</i>
Member: Pi Mu Epsilon; American Mathematical Society	
Grand Valley State University, Allendale, MI	<i>Graduated May 2020</i>
Bachelor of Science in Mathematics	
Member: Pi Mu Epsilon; SACNAS; Mathematical Association of America; American Mathematical Society; GVSU Math & Stats Club.	
Grand Rapids Community College, Grand Rapids, MI	<i>Graduated May 2017</i>
Associate of Arts.	
President of Student Alliance.	

RESEARCH EXPERIENCE

UNM - Research Assistant	May 2023 - Present
<i>Center for Integrated Nanotechnologies (CINT) User</i>	
Investigate composite operators that provide information about tight-binding models. Such information can include joint eigenvalues and eigenvectors, as well as information on perturbations to a system.	
Regents Winrock Minority Doctoral Fellowship	August 2020 - April 2022
<i>Regents Winrock Minority Fellow</i>	
Investigate algorithms for computing Floquet Hamiltonians of systems with time-reversal and chiral symmetries.	
Alayont Fellowship, OURS at GVSU	August 2019 - April 2020
<i>Alayont Fellow</i>	
Investigated guessing games with two unknowns and one lie. Funding was provided by the Office of Undergraduate Research and Scholarships at Grand Valley State University.	
McNair Scholars Program, OURS at GVSU	May 2019 - July 2019
<i>McNair Scholar and Researcher</i>	
Investigated domination on planar graphs with automated conjecture-making as a tool. Funding was provided by McNair and the Office of Undergraduate Research and Scholarships at Grand Valley State University.	
Center for Undergraduate Research in Mathematics, CURM at OC	August 2018 - April 2019
<i>Research Collaborator</i>	

Investigated Stirling numbers of the second kind for star graphs denoted as $F_{p,\ell}^d$. Funding was provided by the Center for Undergraduate Research in Mathematics at Occidental College in California.

MiCUP Scholars Program, at MTU

May 2017 - June 2017

Research Collaborator

Investigated and updated the poling oven for the optoelectric devices that were being developed by the graduate students. Funding was provided by the MiCUP Scholars Program at Michigan Technological University.

PUBLICATIONS

Full list and links: josejgarcia77.github.io/publications/.

Quadratic ϵ -pseudospectrum for Biorthogonal Quantum Mechanics

Due Dec. 2026

Draft in progress

José J. Garcia.

Clifford and quadratic composite operators with applications to non-Hermitian physics
2026

Physics Letters A, Vol. 581, Article 131536

doi:10.1016/j.physleta.2026.131536

José J. Garcia.

Curvature-Guided Sparsification for Graphs with Community Structure

2026

arXiv:2610.38708 [cs.SI]

arXiv:2610.38708

Avin Kolahdooz, Jose Jairo Garcia, Sarah Percival.

ORAL AND POSTER PRESENTATIONS

Quadratic Composite Operator and its Applications to Non-Hermitian Physics November 8, 2026

AMS Fall 2026 Sectional Meeting

Oral Presentation

SS3C — Special Session on Advances in Operator Algebras, III.

Quadratic Composite Operator and its Application to Non-Hermitian Physics October 31, 2026

GS SWAM 2026

Oral Presentation

Scheduled conference talk.

A Composite Operator and its Applications to Biorthogonal Quantum Mechanics October 23, 2026

University of New Mexico

Oral Presentation

Analysis Seminar (Zoom).

Composite Operators, Joint Approximate Eigenstates, and Applications to Physics October 4, 2024

University of New Mexico

Oral Presentation

Mathematical Analysis Seminar.

A Composite Operator Approach to Non-Hermitian Physics September 11, 2024
Sandia National Laboratories *Poster/Virtual/Oral Presentation*

Recent results on composite operator approach to non-Hermitian physics.

Composite Operator Approach to Non-Hermitian Physics August 7, 2024
ORISE/DOE *Oral Presentation*

Recent results on composite operator approach to non-Hermitian physics.

On the Spectral Variation of Almost Normal Matrices and Its Applications September 22, 2023

The University of New Mexico *Oral Presentation*

Investigated the spectral variation of almost normal matrices and its applications.

An Operator-Based Approach to Localized States in Non-Hermitian Systems September 14, 2023

Sandia National Laboratories *Poster/Virtual/Oral Presentation*

Pseudospectra, approximately localized states, and non-Hermitian physics.

Computing Floquet Hamiltonians with Time-Reversal Symmetry July 27, 2022
Center for Integrated Nanotechnologies at Sandia National Laboratories *Oral Presentation*

Investigated algorithms for computing Floquet Hamiltonians of systems with time-reversal and chiral symmetries.

Guessing Games — A Bound for the Responder December 5, 2019
Mathematics Department at Grand Valley State University *Oral Presentation*

Investigated guessing games with two unknown numbers in which the responder can lie at most once; derived a bound required for the responder to win.

Automated Conjecture-Making: Domination on Planar Graphs December 5, 2019
Mathematics Department at Grand Valley State University *Oral Presentation*

Presented results on domination in planar graphs using automated conjecture-making. Funding was provided by McNair and the Office of Undergraduate Research and Scholarships at Grand Valley State University.

Automated Conjecture-Making: Domination on Planar Graphs November 2, 2019
Undergraduate Mathematics Day at the University of Dayton *Oral Presentation*

Presented results on domination in planar graphs using automated conjecture-making. Funding was provided by McNair and the Office of Undergraduate Research and Scholarships at Grand Valley State University.

Automated Conjecture-Making: Domination on Planar Graphs September 5, 2019
Summer Scholars Showcase 2019 at Grand Valley State University *Poster Presentation*

Presented final results on domination in planar graphs using automated conjecture-making to the McNair Scholars Program and other undergraduate research programs funded by the Office of Undergraduate Research and Scholarships at Grand Valley State University.

Automated Conjecture-Making: Domination on Planar Graphs

August 1, 2019

*Mathematical Association of America at MathFest 2019**Oral Presentation*

Presented results on domination in planar graphs using automated conjecture-making. Funding was provided by McNair and the Office of Undergraduate Research and Scholarships at Grand Valley State University.

Analysis of Children's Healing Center Population

August 1, 2019

*Pi Mu Epsilon at MathFest 2019**Oral Presentation*

Presented final results from the PIC Math project on behalf of the group.

Approaches to Stirling Numbers of Sunflower Graphs

April 18, 2019

*Grand Valley State University Mathematics Department**Oral Presentation*

Presented final results to the GVSU Mathematics Department, highlighting techniques developed to compute graphical Stirling numbers.

Membership and Children's Healing Center

April 18, 2019

*Grand Valley State University Mathematics Department**Oral Presentation*

Presented final results from a semester project-based math course using data from the Children's Healing Center (Grand Rapids, MI) to identify membership demographics and growth strategies.

Stirling Numbers for Sunflower Graphs

April 13, 2019

*Midwest Undergraduate Mathematics Symposium**Oral Presentation*

Presented results on graphical Stirling numbers, using proper graph colorings and recursion relations to compute the Stirling numbers of a sunflower graph.

Stirling Numbers for Sunflower Graphs

January 18, 2019

*Mathematical Association of America at the Joint Mathematics Meetings**Poster Presentation*

Presented graphical Stirling numbers, their relationship to classical Stirling numbers, and an application of deletion-contraction.

Graph Stirling Numbers

December 6, 2018

*Grand Valley State University Mathematics Department**Oral Presentation*

Presented preliminary results on graphical Stirling numbers to the mathematics department.

On the Origin of Numbers

April 20, 2017

*Grand Rapids Community College Mathematics Department**Oral Presentation*

Discussed the historical development of numerical nomenclature and its uses.

HONORS, AWARDS, AND FUNDING

UNM Mathematics and Statistics — Outstanding Graduate Student in Research (Pure Mathematics) May 2026

UNM Mathematics and Statistics — Outstanding Graduate Student in Teaching April 2023

Mathematics Department Senior Award at Grand Valley State University April 2020

GVSU Undergraduate Research Scholar at Grand Valley State University April 2020

Outstanding Poster Award at the Joint Mathematics Meetings January 2019

Dean's List at Grand Valley State University 2018–2019
Winter 2018; Winter 2019; Fall 2019.

President's List at Grand Rapids Community College 2015
Winter 2015; Fall 2015.

Dean's List at Grand Rapids Community College 2011–2017
Fall 2011; Winter 2014; Summer 2014; Summer 2016; Winter 2017.

Graduate Student Success Scholarship Fall 2026
The University of New Mexico
\$4,800

CTL Graduate Teaching Scholars Program August 2023 - May 2024
UNM Center for Teaching and Learning / UNM Office of Graduate Studies
University of New Mexico
\$1000

Regents Winrock Minority Fellowship August 2020 - April 2022
UNM Graduate Studies
University of New Mexico
\$40000

APEX Fellowship August 2020 - April 2021
UNM El Centro de la Raza
University of New Mexico
\$1000

Alayont Fellowship August 2019 - April 2020
Office of Undergraduate Research and Scholarships
Grand Valley State University
\$4000

McNair Stipend May 2019 - July 2019
McNair Scholars Program
Grand Valley State University
\$4000

Research Stipend
Center for Undergraduate Research in Mathematics
Occidental College
\$3000

August 2018 - April 2019

MiCUP Stipend
MiCUP Scholars Program
Michigan Technological University
\$2000

May 2017 - June 2017

PROFESSIONAL DEVELOPMENT

2024 Groundwork for Operator Algebras Lecture Series
University of California, Los Angeles

July 15–July 27

The workshop provided graduate students with an accelerated introduction to the basics of operator algebras that is not often found in the typical mathematics graduate coursework.

2023 Modern Mathematics Workshop
Oregon Convention Center

October 25–26

The intention of the workshop was to strengthen the interactions between the harmonic analysis, partial differential equations, and probability communities.

2023 Potential Theory Workshop: Intersections in Harmonic Analysis, Partial Differential Equations and Probability
Centro de Investigación en Matemáticas (CIMAT)

October 2–6

The intention of the workshop was to strengthen the interactions between the harmonic analysis, partial differential equations, and probability communities.

Responsible Conduct of Research
The University of New Mexico

Fall 2022

The training consisted of research ethics across the mathematics curriculum.

Career Paths in the Mathematical Sciences
IMA/Math Alliance Workshop at the University of Minnesota

June 6–7, 2019

The workshop consisted of plenary lectures, panel discussions, active-learning modules, and networking opportunities.

Embracing and Maximizing Feedback
McNair Scholars Program at Grand Valley State University

June 17, 2019

The workshop focused on learning how to identify and take feedback with Dr. Lauren Keough.

How to Build Mentor Networks
McNair Scholars Program at Grand Valley State University

June 17, 2019

The workshop focused on learning how to identify and seek out academic and non-academic mentors, as well as becoming a mentor, with Dr. Jae Basiliere.

Work-Life Balance in Graduate School

June 24, 2019

McNair Scholars Program at Grand Valley State University

Professional development workshop focused on balancing work and life with Dr. Jae Basiliere.

TEACHING EXPERIENCE

Math 1512 - Calculus I

Fall 2026

The University of New Mexico

Instructor of Record.

Math 314 - Linear Algebra with Applications

Summer 2026

The University of New Mexico

Instructor of Record.

Math 316 - Applied Ordinary Differential Equations

Summer 2025

The University of New Mexico

Instructor of Record.

Math 375 - Introduction to Numerical Computing

Spring 2024

The University of New Mexico

Teaching Assistant (grading two sections).

Math 1512 - Calculus I

Fall 2023

The University of New Mexico

Instructor of Record.

TA-Seminar

Fall 2023

The University of New Mexico

Co-led recitation for teaching assistants beginning in the calculus sections offered at the University of New Mexico.

Math 1522 - Calculus II

Spring 2023

The University of New Mexico

Instructor of Record.

Teaching Assistant - Mathematics

Fall 2022

The University of New Mexico

Ran recitations for Calculus II and later served as Instructor of Record for the course in Spring 2023.

Grader - Mathematics

August 2020 - December 2022

The University of New Mexico

Course grading for the Mathematics Department at UNM.

Math 314 - Linear Algebra with Applications (Grader)

Fall 2020

The University of New Mexico

Grader (two sections).

WORK EXPERIENCE

MEISPP Internship

May 2024 - August 2024

Oak Ridge Institute for Science and Education

Minority Educational Institution Student Partnership Program (MEISPP) Research Assistant.

GEARUp Tutor - Mathematics

December 2019 - April 2020

Grand Rapids Community College

Provided in-class tutoring to underrepresented middle school students in various schools as part of the GEARUp program.

Tutor - Cruisin' to College

June 2018 - August 2018

Grand Rapids Community College

Tutored high school students in entry-level college math courses.

Orientation Ambassador

May 2018 - August 2018

Grand Rapids Community College

Assisted students signing up for classes and provided information on college resources.

Tutor - TRiO Upward Bound

June 2018 - July 2018

Grand Valley State University

Planned activities for students in the summer program and tutored students in mathematics, physics, and Spanish.

Professional Tutor - Mathematics

September 2015 - August 2018

Grand Rapids Community College

Provided one-on-one and group tutoring. Gave weekly updates to a supervisor and attended training sessions and workshops.

Various Companies

2005–2016

Grand Rapids Community College

Tutored high school students in entry-level college math courses.

SERVICE

UNM McNair Program

October 2022 - Present

Volunteer Panelist

Once a year.

URInspiration/URInspiración, ASU, UNM, FIU

April 5, 2023

Moderator and Evaluator — Spanish/Español

2023 UNM Teaching Conference

March 22, 2023

Humanizing Math Education — Panelist

Grand Rapids Community College

September 2016 - September 2020

Volunteer Mathematics Tutor

Volunteered as a mathematics tutor for students who needed one-on-one help with classes outside of the predetermined tutoring sessions.

Math In Action Conference, GVSU

February 23, 2019

Volunteer

Math in Action presents lively and informative discussions of current issues in mathematics education while providing an opportunity for practicing PreK–12 teachers, prospective teachers, curriculum directors, and college and university faculty to share ideas, concerns, and resources.

NOTABLE SKILLS

Software	Inventory systems, Microsoft Office Suite, L ^A T _E X
Programming	Visual Basic, Python, Mathematica, Fortran, zsh/bash, MATLAB
Mathematics	Tutoring, research methodology, mentoring
Other	Leadership, mentoring, delegation, bilingual (Spanish)