

## CONTACT INFORMATION

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## EDUCATION

**Arizona State University**, Tempe, Arizona Exp. 2023  
Ph.D. Physics  
Advisor: A. S. Botana  
**Piedmont College**, Demorest, Georgia 2019  
B.S. Applied Mathematics & Physics, *Summa Cum Laude*

## PUBLICATIONS Citations: 212 \* = equal contribution

H. LaBollita, A. Hampel, J. Karp, A. S. Botana, and A. J. Millis, “Conductivity of infinite-layer NdNiO<sub>2</sub> as a probe of spectator bands,” [arxiv:2303.06046](#)

D. F. Segedin, B. H. Goodge, G. A. Pan, Q. Song, H. LaBollita, et. al., “Limits to the strain engineering of layered-square planar nickelate thin films,” [Nat Comm 14, 1468 \(2023\)](#)

M. R. Norman, A. S. Botana, J. Karp, A. Hampel, H. LaBollita, et. al., “Orbital polarization, charge transfer, and fluorescence in reduced valence nickelates,” [Phys. Rev. B \(2023\)](#)

Q. Song, et. al., “Antiferromagnetic metal phase in an electron doped rare earth nickelate,” [Nat. Phys. \(2023\)](#)

G. Grissonnanche, G. A. Pan, H. LaBollita, et. al., “Seebeck coefficient in a nickelate superconductor: electronic dispersion in the strange metal phase,” [arxiv:2210.10987](#)

H. LaBollita, M. Jung, and A. S. Botana, “Many-body electronic structure of  $d^{9-\delta}$  nickelates,” [Phys. Rev. B 106, 115132 \(2022\)](#)

M. Jung, H. LaBollita, V. Pardo, and A. S. Botana, “Antiferromagnetic insulating state in layered nickelates at half filling,” [Sci. Rep. 12, 17864 \(2022\)](#).

X. Xiang\*, H. LaBollita\* et al., “Visualizing the out-of-plane electronic correlations in an intercalated transition metal dichalcogenide,” [Phys. Rev. B 105, L121107 \(2022\)](#)

H. LaBollita and A. S. Botana, “Correlated electronic structure of a quintuple-layer nickelate,” [Phys. Rev. B 105 085118 \(2022\)](#).

G. A. Pan, D. F. Segedin, H. LaBollita et al., “Superconductivity in a quintuple-layer square-planar nickelate,” [Nature Materials 21, 160-164 \(2022\)](#).

H. LaBollita and A. S. Botana, “Tuning the Van Hove singularities in  $AV_3Sb_5$  ( $A = K, Rb, Cs$ ) via pressure and doping,” [Phys. Rev. B 104, 205129 \(2021\)](#).

M. Akram\*, H. LaBollita\*, D. Dey, J. Kapeghian, A. S. Botana, and O. Erten, “Moiré skyrmions and chiral magnetic phases in twisted CrX<sub>3</sub> (X = I, Br, Cl) bilayers,” [Nano Letters 21, 15, 6633-6639 \(2021\)](#).

H. LaBollita and A. S. Botana, “Electronic structure and magnetic properties of higher-order nickelates:  $La_{n+1}Ni_nO_{2n+2}$  ( $n = 4 - 6$ ),” [Phys. Rev. B 104 035148 \(2021\)](#).

J. Krishna, H. LaBollita, A. O. Fumega, V. Pardo, and A.S. Botana, “Effects of Sr-doping on the electronic and spin-state properties of infinite-layer nickelates: Nature of holes,” [Phys. Rev. B 102, 224506 \(2020\)](#).

## PRESENTATIONS † = Talk ° = Poster

H. LaBollita<sup>†</sup>, “Conductivity of infinite-layer NdNiO<sub>2</sub> as a probe of spectator bands” APS March Meeting, Las Vegas, NV, USA Mar. 2023

H. LaBollita<sup>†</sup> and A. S. Botana, “Electronic structure and magnetic properties of higher-order nickelates:  $La_{n+1}Ni_nO_{2n+2}$  ( $n = 4 - 6$ ),” APS March Meeting, Online due to COVID-19 Mar. 2021

H. LaBollita<sup>†</sup>, “Hadronic Light-by-Light Contribution to the Anomalous Magnetic Moment of the

Muon from the  $\omega$  meson,” QEP Research Symposium, Piedmont College May 2019  
H. LaBollita<sup>o</sup>, M. Hjorth-Jensen, S. Liddick, “Machine Learning Applied to Multi-Electron Events in Scintillator,” APS March Meeting Mar. 2019  
H. LaBollita<sup>o</sup>, M. Hjorth-Jensen, S. Liddick, “Machine Learning Applied to Multi-Electron Events in Scintillator,” REU Research Symposium, Michigan State Univeristy Jul. 2018  
H. LaBollita<sup>†</sup>, “Characterization of Mirror Birefringence for ALPS,” REU program, Univeristy of Florida Aug. 2017

## RESEARCH EXPERIENCE

Graduate Research Assistant, *Arizona State University* 2020 – 23

Advisor: A. S. Botana

Currently, using a combination of density-functional theory (DFT) and dynamical mean-field theory to understand the electronic structure of the nickel-oxide materials (nickelates). Experienced user of electronic structure codes: WIEN2k and VASP. Experienced user of the TRIQS software libraries to conduct DFT + DMFT calculations. Completed several projects in the Botana group using a variety of electronic structure tools and techniques.

Predoctoral Researcher, *Center for Computational Quantum Physics, Flatiron Institute* 2022

Advisor: A. Hampel and A. J. Millis

Contributed to open source software project TRIQS.

Research Rotation, *Arizona State University* 2019

Advisor: P. Sulc

Used machine learning and implemented a Gillespie algorithm to predict how a given RNA sequence will fold.

Senior Undergraduate Research, *Piedmont College* 2018 – 19

Advisor: N. Holt

Used effective field theory to calculate the hadronic light-by-light contributions to the anomalous magnetic moment of the muon from the  $\rho$ ,  $\pi$ , and  $\omega$  mesons.

Research Experience for Undergraduates, *Michigan State University* 2018

Advisor: M. Hjorth-Jensen

Applied supervised machine learning algorithms as a novel data analysis technique for an eperiment investigating the shape coexistence of the nucelus via conversion electron spectroscopy.

Research Experience for Undergraduates, *University of Florida* 2017

Advisors: D. Tanner and G. Mueller

Characterized the intrinsic birefringence of dielectric mirrors using a heterodyne polarimetric technique for the Any Light Particle Search (ALPS) experiment.

## SOFTWARE

[w2kplot](#): A Python wrapper to Matplotlib to create publication quality figures from WIEN2k electronic structure calculations.

[ris-2-bib](#): A command line tool to convert RIS bibliography files to bibtex format.

[PortfolioOptim.jl](#): A Julia package for optimizing financial portfolios.

## AWARDS & HONORS

Wally Stoelzel Scholarship 2021 – 22

Teaching Excellence Award, Graduate & Professional Student Association, ASU 2020

Arizona State University Summer Graduate Fellowship 2020

NCAA Postgraduate Scholarhsip 2019

Highest GPA Male Athlete, Piedmont College 2019

Scholar Athlete of the Year, Piedmont College 2019

Glenn W. & Edna Ellard Scholarship 2016 – 19

Seaborn Ashley & Dana Smith Ashely Scholarship 2016 – 18

Math & Physics Department Scholarship 2015 – 19

Trustee Scholarship 2015

TEACHING	<b>Arizona State University</b> , Tempe, AZ	
	<i>Teaching Assistant</i> , PHY 121: Mechanics for Engineers	Spring 2020
	<i>Teaching Assistant</i> , PHY 131: Electricity & Magnetism for Engineers	Fall 2019, Fall 2020
	<b>Piedmont College</b> , Demorest, GA	
	<i>Teaching Assistant</i>	2018 – 19
	<i>Math and Physics Tutor</i>	2016 – 18
SERVICE	<i>Organizer</i> , Grad2Grad Talks, ASU Department of Physics	2021 –
	<i>Graduate Student Representative</i> , ASU Department of Physics Bylaws Committee	2021 – 22
	<i>Mentor</i> , <a href="#">ASU Sundial Project</a>	2020 – 21
OUTREACH	<i>Instructor</i> , <a href="#">Clubes de Ciencia</a>	2021
	<i>Organizer</i> , Maker Faire, <i>Henry Ford Museum</i>	2018
	<i>Organizer</i> , UF Center for Pre-Collegiate Education and Training, <i>University of Florida</i>	2017
MENTORSHIP	Adriana Baniecki, SCENE high-school student	2021
	Siva Buddy, SCENE high-school student	2020

References available upon request.