

# Curriculum Vitae of John Bonini

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<https://github.com/jrbp>

## RESEARCH INTERESTS

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Application and development of computational and data-driven techniques to facilitate the discovery and understanding of functional materials, including ferroelectrics, piezoelectrics, topological insulators and semimetals as bulk, thin films, and heterostructures.

## EDUCATION

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- 2013- **PhD. in Physics** (expected 2020)  
Rutgers University, Condensed Matter Theory  
Advisor: Karin Rabe
- 2009-2013 **B.S. in Physics**  
Rowan University, Minor in Mathematics, Minor in Computer Science

## ARTICLES

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- 2020 “Berry Flux Diagonalization: Application to Electric Polarization”  
J. Bonini, D. Vanderbilt, and K. M. Rabe  
*arXiv:2002.02995 [cond-mat.mtrl-sci]*
- 2019 “First-principles bulk-layer model for dielectric and piezoelectric responses in superlattices”  
J. Bonini, J. W. Bennett, P. Chandra, and K. M. Rabe  
*Phys. Rev. B* **99**, 104107
- 2011 “Enhanced resonant magnetoelectric coupling in frequency-tunable composite multiferroic bimorph structures”  
P. Finkel, J. Bonini, E. Garrity, K. Bussman, J. Gao, J. F. Li, S. E. Lofland, and D. Viehland  
*Appl. Phys. Lett.* **98**, 092905

## TALKS

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- 2020 “First principles dielectric slab model for dielectric and piezoelectric response in superlattices”  
*Fundamental Physics of Ferroelectrics, Tampa, Florida*
- 2019 “Fantastic metastable states and where to find them: A computational search for superlattices with enhanced functional properties”  
*APS March Meeting, Boston, Massachusetts*

- “First principles dielectric slab model for dielectric and piezoelectric response in superlattices”  
*Symposium of the Laboratory for Surface Modification, Rutgers University*
- “First principles dielectric slab model for dielectric and piezoelectric response in superlattices”  
*Fundamental Physics of Ferroelectrics, Tampa, Florida*
- 2018 “First principles dielectric slab model for dielectric and piezoelectric response in superlattices”  
*APS March Meeting, Los Angeles, California*
- 2017 “Efficient computation of spontaneous polarization using Wannier center displacements”  
*APS March Meeting, New Orleans, Louisiana*
- 2016 “Efficient computation of spontaneous polarization using Wannier center displacements”  
*Fundamental Physics of Ferroelectrics, Washington D.C.*
- 2015 “High throughput density functional theory calculations for predicting new ferroelectrics”  
*Student Seminars in Physics and Astronomy, Rutgers University*

## SCHOOLS/WORKSHOPS ATTENDED

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- 2019 Workshop on Recent Developments in Electronic Structure  
 University of Illinois at Urbana-Champaign  
 Poster: “Computing spontaneous polarization without sampling a switching path”
- 2018 NSF EFRI-2DARE, DMRED-2D & MIP Grantees Meeting  
 Pennsylvania State University Materials Research Institute
- 2017 International School on Oxide Electronics  
 Institut d’Études Scientifiques Cargèse, France  
 Poster: “Efficient computation of spontaneous polarization using Wannier center displacements”  
 Workshop on Recent Developments in Electronic Structure  
 Princeton University
- 2015 Machine Learning for Materials Science Workshop  
 University of Maryland
- 2014 Quantum Espresso Workshop  
 Pennsylvania State University
- 2013 NJSGC Annual Summer Research Conference  
 Rutgers University  
 Poster: “Engineering the interaction between cold dipolar molecules with external fields to produce novel quantum phases”

- 2012 NJSGC Academic Year Fellowship Poster Session  
Rutgers University  
Poster: “Design of a system for Elastic, Electric, and Magnetic Properties of Multi-ferroic Devices ”  
  
STEM Symposium  
Rowan University  
Poster: “Design of a system for Elastic, Electric, and Magnetic Properties of Multi-ferroic Devices ”

## AWARDS

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- 2019 **Best Oral Presentation by student or postdoc (3rd Place)**  
Fundamental Physics of Ferroelectrics Workshop  
  
2013 **Excellence Fellowship**  
Rutgers University  
  
**Medallion for Excellence in Physics**  
Rowan University

## COMPUTER SKILLS

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Python, HPC, Linux, MongoDB, Git, Bash, Fortran, Lisp, C

## REFERENCES

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### **Karin Rabe**

Board of Governors Professor  
Department of Physics and Astronomy, Rutgers University  
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### **David Vanderbilt**

Board of Governors Professor  
Department of Physics and Astronomy, Rutgers University  
dhv@physics.rutgers.edu

### **Cyrus Dryer**

Assistant Professor  
Department of Physics and Astronomy, Stony Brook University  
Affiliate Associate Research Scientist  
Center for Computational Quantum Physics, Flatiron Institute  
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