

Biographical Sketch - MARCO BUONGIORNO NARDELLI

University Distinguished Research Professor-Department of Physics and Department of Chemistry
CEMI, Center for Experimental Music and Intermedia, and
iARTA, initiative for Advanced Research in Technology and the Arts

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Professional preparation

1989 B.S. in Physics at the University of Rome, “La Sapienza”, Rome, Italy

1991 M.S. in Physics at the International School for Advanced Studies (SISSA/ISAS) in Trieste, Italy, Graduate Advisor: Prof. Stefano Baroni

1993 Ph.D. in Physics at the International School for Advanced Studies (SISSA/ISAS) in Trieste, Italy, Graduate Advisor: Prof. Stefano Baroni

Appointments

Sep. 2014 to present University Distinguished Research Professor, University of North Texas.

Jan. 2012 to present Professor, Department of Physics (80%) and Department of Chemistry (20%), University of North Texas.

Aug. 2009 - Dec. 2011 Professor, Department of Physics, North Carolina State University.

Aug. 2005 - Aug. 2009 Associate professor, Department of Physics, NCSU.

Aug. 2001 - Aug. 2005 Assistant professor, Department of Physics, NCSU.

Nov. 1998 - Aug. 2001 Research associate, Department of Physics, NCSU

Nov. 1995 - Nov. 1998 Postdoc, Department of Physics, North Carolina State University

Postdoctoral Advisor: Prof. Jerry Bernholc

Nov. 1993 - Nov. 1995 Postdoc, Laboratorio INFN-TASC, Trieste, Italy

Postdoctoral Advisor: Prof. Fernando Tommasini

Recent publications

1. F. Rose, C. Toher, E. Gossett, C. Oses, M. Buongiorno Nardelli, M. Fornari, and S. Curtarolo, *AFLUX: The LUX materials search API for the AFLOWdata repositories*, Comp. Mat. Sci., in press (2017).
2. A.R. Supka, T.E. Lyons, L. Liyanage, P. D'Amico, R. Al Rahal Al Orabi, S. Mahatara, P. Gopal, C. Toher, D. Ceresoli, A. Calzolari, S. Curtarolo, M. Buongiorno Nardelli, and M. Fornari, *AFLOWpi: A minimalist approach to high-throughput ab initio calculations including the generation of tight-binding hamiltonians*, Comp. Mat. Sci. (2017).
3. J. J. Plata, P. Nath, D. Usanmaz, J. Carrete, C. Toher, M. de Jong, M. D. Asta, M. Fornari, M. Buongiorno Nardelli, and S. Curtarolo, *An efficient and accurate framework for calculating lattice thermal conductivity of solids: AAPL - AFLOW Anharmonic Automatic Phonon Library*, NPJ Computational Materials, in press (2017).
4. P. Nath, J. J. Plata, D. Usanmaz, M. Fornari, M. Buongiorno Nardelli, C. Toher, and S. Curtarolo, *High Throughput combinatorial method for fast and robust prediction of lattice thermal conductivity*, Scripta Mater. **129**, 88-93 (2017).
5. C. Toher, C. Oses, J. J. Plata, D. Hicks, F. Rose, O. Levy, M. de Jong, M. D. Asta, M. Fornari, M. Buongiorno Nardelli, and S. Curtarolo, *Combining the AFLOW GIBBS and Elastic*

Libraries for efficiently and robustly screening thermo-mechanical properties of solids, in press, Phys. Rev. Materials (2017).

6. Luis A. Agapito, Sohrab Ismail-Beigi, Stefano Curtarolo, Marco Fornari and Marco Buongiorno Nardelli, *Accurate Tight-Binding Hamiltonian Matrices from Ab-Initio Calculations: Minimal Basis Sets*, Phys. Rev. B **93**, 035104 (2016).
7. M. Buongiorno Nardelli, *materialsoundmusic: a computer-aided data-driven composition environment for the sonification and dramatization of scientific data streams*, proceedings of the 41st International Computer Music Conference, Denton, TX (USA), (2015).
8. Y. Tang, Z. M. Gibbs, L. A. Agapito, G. Liab, H.-S. Kimab, M. Buongiorno Nardelli, S. Curtarolo, and G. J. Snyder, *Convergence of Multivalley Bands as Electronic Origin of High Thermoelectric Performance in CoSb₃ Skutterudite*, Nature Mat. **14** 1223 (2015).
9. C. E. Calderon, J. J. Plata, C. Toher, C. Oses, O. Levy, M. Fornari, A. Natan, M. Mehl, G. L. W. Hart, M. Buongiorno Nardelli, and S. Curtarolo, *The AFLOW Standard for High-Throughput Materials Science Calculations*, Comp. Mat. Sci. **108** Part A, 233-238 (2015).
10. Rui Dong, V. Ranjan, Marco Buongiorno Nardelli and J. Bernholc, *Atomistic simulations of aromatic polyurea and polyamide for capacitive energy storage*, Phys. Rev. B, **92** 024203 (2015).
11. P. Gopal, M. Fornari, S. Curtarolo, L. A. Agapito, L. Liyanage, and M. Buongiorno Nardelli, *Improved predictions of the physical properties of Zn- and Cd-based wide band-gap semiconductors: a validation of the ACBN0 functional*, Phys. Rev. B **91**, 245202 (2015).
12. A. Catellani, A. Ruini, M. Buongiorno Nardelli, and A. Calzolari, *Unconventional co-existence of plasmon and thermoelectric activity in In:ZnO nanowires*, RSC Advances **5**, 44865 (2015).
13. Luis A. Agapito, Stefano Curtarolo, and Marco Buongiorno Nardelli, *Reformulation of DFT+U as a Pseudohybrid Hubbard Density Functional for Accelerated Materials Discovery*, Phys. Rev. X **5**, 011006 (2015)

Total number of papers: 136+; H-factor: 47.

Honors and awards

- Resident Artist, Djerassi Resident Artists Program “Scientific Delirium Madness, 4.0”, Redwood City, CA, July 2017
- Leadership Innovation Award, University of North Texas, 2017
- University Distinguished Research Professor, University of North Texas, 2014
- Fellow of the Institute of Physics, 2011.
- Fellow of the American Physical Society, 2010.
- Sigma Xi Faculty Research Award, NCSU Chapter, May 2004.

Scientific software development

- **PAOFLOW**: A utility to construct and operate on ab initio Hamiltonians from the Projections of electronic wavefunctions on Atomic Orbital bases (PAO), including characterization of topological materials (distributed at www.AFLOW.org).
- **AFLOW**, a distributed materials properties repository from high-throughput ab initio calculations (www.AFLOW.org).
- **Quantum ESPRESSO**, an integrated suite of Open-Source computer codes for electronic-structure calculations and materials modeling at the nanoscale (<http://www.quantum-espresso.org>).

Synergistic activities

1. Professional affiliations: APS, MRS, SigmaXi

2. Editorial Board Member:

- Scientific Reports, Nature Publishing Group
- Frontiers in Physics, Frontiers Research Topics

3. Patent and inventions:

- “Catalytic role of defective Carbon substrates in the dissociation of water”, NCSU #05-058, March 2005
- “Piezoelectric and pyroelectric polymers with boron nitride backbone”, S. Nakhmanson, M. Buongiorno Nardelli and J. Bernholc, NCSU #04-011, August 2003.
- “Coulomb Buffer as a Method for Adjusting Band Offset and Alignment at Semiconductor/Insulator and Semiconductor/Semiconductor Interfaces”, F. Walker, R. Mc Kee, M. Buongiorno Nardelli, W.J. Shelton and M.G. Stocks, ORNL #1037, January 2002.
- “BN/C nanotubes for Micro-Electro-Mechanical (MEM) applications”, M. Buongiorno Nardelli, NCSU # 000-133, June 2000.

Musical bio:

Marco Buongiorno Nardelli’s broad musical interests span from the baroque repertoire to jazz, contemporary and electronic music. Educated as both a musician and a physicist, he holds a BM in Music Theory and Composition from the Conservatorio "Luigi Cherubini" in Florence, Italy, studied flute with Oro and Gian-Luca Petrucci in Rome and Brooks deWetter-Smith at UNC-Chapel Hill and sung in the choir of the Accademia Filarmonica Romana with M. Pablo Colino, who introduced him to music at a very early age. He has studied composition with Riccardo Giagni (Rome), Lyda di Cuffa (Florence), Alan Shockley (RI College) and Allen Anderson (UNC-Chapel Hill). As a performer he has recorded for the Italian National Radio and Television (RAI) and has released various CD's with the world music group Kolaj, the Arabic-jazz-fusion ensemble Jaafar and he is one of the founders of Ecco La Musica, a composers collective in Raleigh, NC. He has played in the Raleigh Civic Symphony and Chamber Orchestra and is a member of ASCAP, the Center for the Promotion of Contemporary Composers, the American Music Center, Chicago’s Accessible Contemporary Music, SEAMUS and ICMA. His music has been premiered, among others, by the New York Miniaturist Ensemble, London's C.O.M.A. group, the Accessible Contemporary Music ensemble of Chicago, the Raleigh Civic Chamber Orchestra, GaTech's Sonic Generator, ICMC and University of North Texas NOVA Ensemble. Among his awards, the composition "Tzolk'in" for three marimbas has received a honorable mention at the Second Annual Louisiana State University Percussion Society's Percussion Ensemble Composition Contest in 2009 and was the winner of the 2010 Volta Trio Composition Competition. As a member of Ecco La Musica, he has released the critically acclaimed CD "Morning Moon" (Big Round Records, 2012). He is a member of CEMI, the Center for Experimental Music and Intermedia, and iARTA, the Initiative for Advanced Research in Technology the Arts at the University of North Texas.

His Art/Science work has been highlighted in numerous interviews and artist’s profiles (Art & Science Collaborations, Inc. (ASCI), Society of Composers, Inc., ICMA) and he has been honored to be one of the residents at the Scientific Delirium Madness 4.0 - Djerassi Resident Artists Program in Woodside, CA in July 2017.

Recent performances:

- February 27, 2018, premiere of *un giro d’anello* for electric string quartet and fixed media, Spectrum concert, MEIT Theater, University of North Texas
- February 26, 2018, Music Now, MEIT Theater, University of North Texas
- July 16, 2017 - Premiere of *Trio*, for flute, oboe and cello - Djerassi Resident Artist Program, Woodside, CA

- July 2, 2017 - Premiere of *on the resonance of the fog*, for flute and percussions - Djerassi Resident Artist Program, Woodside, CA
- June 28 - July 26, 2017 - Scientific Delirium Madness 4.0 - Djerassi Resident Artist Program, Woodside, CA
- August 17, 2016 - Society of Composers, Inc. member of the day.
- March 30, 2016 - presentation of the materialsoundmusic project at the Spring 2016 TxHATS meeting, University of North Texas.
- December 2015 - Honored to be the featured member of the Art & Science Collaborations, Inc. (ASCI) for the month of December. You can learn more at <http://www.asci.org/artikel1465.html>!
- September 25 - October 1, 2015 - materialsoundmusic: *a computer-aided data-driven composition environment for the sonification and dramatization of scientific data streams*, 41th International Computer Music Conference, Denton, TX (USA).
- September 30 - Premiere of "Ricerca" ("Invention n. 2" from "Inventions for data streams"), 41th International Computer Music Conference, Denton, TX (USA), Concert 23, 11AM Voertman Hall.
- June 17, 2015 - Featured profile on UNT InHouse online magazine [here](#).
- May 21, 2015 - "*High-throughput materials discovery and development (and a digression on Music, Science and Data-driven Composition)*", University of Sao Paulo, Sao Paulo, Brazil.
- April 27, 2015 - "*Music, Science and Data-driven Composition*", Music Now, MEIT 11:00AM, College of Music, University of North Texas. Premier two pieces for MIDI player piano and electronics, "Music for 88 keys" and "Contrappunto" (from "Inventions for data streams").
- April 27, 2015 - "*Tzolk'in*" for three marimbas (Justin Matthews, Alex Mendoza and Tim Feerst, marimbas), Spectrum concert, 8:00PM, College of Music, University of North Texas.