Nicholas Domingo Ignacio

Ph.D. Candidate, Texas Materials Institute, The University of Texas at Austin
SCGSR Fellow, Center of Nanophase Materials Sciences, Oak Ridge National Lab

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Research Interests

- Integration of 2D materials in PCM and RRAM for neuromorphic computing
- Crystalline-crystalline phase transformations for multilevel PCM.
- Electronic transport in low dimensional material devices
- Scanning transmission electron microscopy and scanning tunnelling microscopy (Cryogenic STM superuser at TMI)
- Materials science pedagogy

Education

08/2021 – current: **Ph.D. Candidate** (advisor Prof. Deji Akinwande) Materials Science and Engineering Program and Texas Materials Institute, University of Texas at Austin, Austin, USA

01/2020 – 06/2020: **Visiting Student through Materials Exchange Program**, University of Oxford, Oxford, UK

08/2017 – 06/2021: **S.B. Materials Science and Engineering**, Massachusetts Institute of Technology, Cambridge, USA

Awards, Honors & Certificates

09/2023: **Science Graduate Student Research (SCGSR) Fellowship**, U.S. Department of Energy, hosted by Oak Ridge National Lab, Center of Nanophase Materials Science, Scanning Tunneling Microscopy Group

02/2023: **K-12 Outreach Certificate**, CDCM MRSEC, University of Texas at Austin

12/2022: **Professional Development Award**, University of Texas at Austin

08/2021: **Virginia and Ernest Cockrell, Jr. Fellow**, University of Texas at Austin

08/2021: **T. W. Whaley, Jr. Scholarship**, University of Texas at Austin

Professional Activities

Publications

In Preparation:

M. Floto*, **N. D. Ignacio***, R. Ciufo, D. Akinwande, C.B. Mullins, Hydrogen-Induced Surface Reconstruction of Co(poly) Studied by STM

S. Kutagulla, C. Favela, **N. D. Ignacio**, N. H. Le, I. Terry, C. Bohn, B. Korgel, D. Akiwnande, Defect engineered single layer graphene for extended performance and range for fuel cell electric vehicles

Prepress:

Y. Lee, Y. Huang, Y.-F. Chang, S. J. Yang, **N.D. Ignacio**, S. Kutagulla, S. Mohan, S. Kim, J. Lee, D. Akinwande, S. Kim, Programmable Retention Characteristics in MoS2-Based Atomristors for Neuromorphic and Reservoir Computing Systems, *ACS Nano* (2024) **In Review**

Published:

J. Xie, Md. N. Patoary, Md. A. Rahman Laskar, **N. D**. **Ignacio**, X. Zhan, U. Celano, D. Akinwande, I. Sanchez Esqueda, Quantum conductance in vertical hexagonal boron nitride memristors with graphene-edge contacts, *ACS Nano Lett.* (2024)

N. D. Ignacio, J. Fatheema, Y. Jeon, D. Akinwande, Air-stable atomically encapsulated crystalline-crystalline phase transitions in In_2Se_3, *Adv Elec Matr* (2023)

S. Mohan, D. Kireev, S. Kutagulla, **N. D. Ignacio**, Y. Gu, H. Celio, X. Zun, D. Akinwande, K. Liechti, Direct, Metal-free Growth and Dry Separation of Bilayer Graphene on Sapphire: Implications for Electronic Applications, *ACS Appl. Nano Mater* (2023)

Y. Huang*, Y. Gu*, S. Mohan, A. Dolocan, **N. D. Ignacio**, S. Kutagulla, K. Matthews, A. Londoño-Calderon, Y.-F Chang, Y.-C. Chen, J. Warner, M.T. Pettes, J.C. Lee, D. Akinwande, Reliability improvement and effective switching model of thin-film MoS_2 memristors**,** *Adv Funct Mater* (2023)

***** *Denotes equal contribution*

Conferences

Posters

11/2023:

"Structural Phase Transitions for Multi-Level In2Se3 Based Phase Change Memory", Materials Research Society (MRS) Fall 2023 Meeting, (Boston, Ma, USA)

11/2022: **"Control of Crystalline-Crystalline Phase Changes in In2Se3 by Encapsulation",** Materials Research Society (MRS) Fall 2022 Meeting, (Boston, Ma, USA)

06/2022: **"Hydrogen-Induced Surface Reconstruction of Co(poly) Studied by STM",** 82nd PEC Meeting 2022, (Chicago, IL, USA)

Member

American Chemical Society (ACS)
American Society of Mechanical Engineers (ASME)
Materials Research Society (MRS)

Teaching Experience

01/2023 – 05/2023: **Teaching Assistant/Supplementary Instruction Leader**, Introduction to Astronomy (AST301), Dept. of Astronomy, UT Austin, Prof. Paul Shapiro
05/2022 – 08/2022: **Teaching Assistant**, Materials Engineering (ME334), Dept. of Mechanical Engineering, UT Austin, Dr. Jeremiah McCallister
09/2019 – 12/2019: **Teaching Assistant/Recitation Leader**, Introduction to Solid State Chemistry (3.091), MIT, Prof. Jeff Grossman

Pedagogical Training

08/2022 – 05/2024: **Graduate Certificate in Engineering Education**, Cockrell School of Engineering, UT Austin
08/2023 – 12/2023: **Teaching Preparation Certificate**, Center for Teaching and Learning, UT Austin
06/2023: **Inclusive Classrooms Leadership**, Division of Diversity and Community Engagement, UT Austin

Mentoring Experience

2023: Ikel Hernandez, REU at UT Austin, Texas State University
(current: undergraduate, Texas State University)

Service & Outreach

Reviewer for:
(2023 – current) ACS Nano, Journal of Emerging Investigators

08/2023 – current: UT Austin Materials Research Society President
08/2023 – current: UT Austin Graduate Engineering Council Financial Director
08/2023 – current: UT Austin Graduate Student Assembly Materials Science representative
09/2022 – 09/2023: Cockrell School of Engineering DEI board member

02/2022 – current:	K-12 STEM outreach through UT MRSEC in local elementary schools
08/2021 – current:	MIT Education Councilor (Interview prospective undergraduates)
08/2020 – 06/2022:	MIT First year associate advisor
08/2020 – 06/2022:	MIT Undergraduate associate advising steering committee member
06/2020 – 06/2022:	Department Representative on DEI board of MIT Undergraduate Association
08/2020 – 06/2021:	Vice President of Society of Undergraduate Materials Scientists at MIT
08/2018 – 08/2021:	Department of Materials Science Freshmen Pre-orientation program mentor and coordinator

Professional Experience

08/2020 – 07/2021:	**SLS Materials Engineer**, Formlabs
06/2019 – 08/2019:	**Low Observable Materials Intern**, Lockheed Martin Skunkworks
01/2019:	**Low Observable Materials Intern**, Lockheed Martin Skunkworks

References

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