

Paul Masih Das | Resume

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Professional Summary

- Researcher with 12 years of experience across quantum computing, superconducting qubits, and hardware integration in industrial and academic environments. Author of 30+ peer-reviewed publications and 2 patents.
- Ph.D. and Postdoc in Condensed Matter Physics with 8 years of experience in cryogenic systems, low-noise/temperature electronics, and microwave circuits.
- 2+ years of experience with Intel 4 hardware integration and product development; managing a cross-functional task force to drive yield, performance, and quality of new product lines towards high-volume manufacturing targets.

Work Experience

Defect Team Chair, Hardware Integration

Intel Corporation, Logic Technology Development (Hillsboro, OR)

2021–Present

- Developing critical defect reduction packages for Intel 4 product line ramp and manufacturing targets in 2023.
- Driving daily task force meetings between process engineers, defect metrologists, and integration to increase product yield and implement improved chip manufacturing processes.
- Optimizing process flows, device yield, and electronic chip performance in Intel 4 products.
- Presenting weekly back-end updates to Intel VPs and product team for establishing key Client Computing Group targets and product release dates.

Postdoctoral Researcher

Northwestern University, Superconducting Quantum Materials Center (Evanston, IL)

2020–2021

- Correlated material defects and quantum decoherence in superconducting transmon qubits via nanocharacterization.
- Collaborated with Rigetti Computing to drive product development by increasing qubit decoherence times.
- Mitigated structural defects in Nb superconductors with optimized crystallographic growth and metallic deposition techniques.
- Developed growth processes for emerging quantum materials and testing nanoelectronic, nanophotonic, and chemical properties.

Ph.D. Candidate

University of Pennsylvania, Physics Department (Philadelphia, PA)

2014–2020

- Designed nanoarchitectures for low-dimensional quantum materials and characterized electronic, optical, and structural properties.
- Studied different chemical vapor deposition growth techniques for fabricating atomically thin materials and nanostructures.
- Developed methods for engineering atomic defects in low-dimensional nanomaterials with focused ion and electron beams.
- Performed wafer-scale fabrication of silicon-based nanostructures via photolithography/EBL, vapor deposition, and wet/dry etching.
- Investigated the electronic, ionic, and gas transport properties of 2D nanopores and nanoporous membranes.

Research Scientist

Goepfert LLC, Pennovation (Philadelphia, PA)

2018

- Tested scalable techniques for growing pristine, large-area 2D semiconductors and developed methods for efficient quality control.
- Maximized throughput of nanofabrication procedures and solution-phase processes for fabricating silicon-based nanofluidic channels.

Education

Ph.D. in Physics

University of Pennsylvania, School of Arts and Sciences (GPA: 3.89/4.0)

2020

M.S. in Physics

University of Pennsylvania, School of Arts and Sciences (GPA: 3.72/4.0)

2016

B.S. in Materials Science and Engineering

Johns Hopkins University, School of Engineering (GPA: 3.86/4.0)

2014

Selected Publications

[1]: A. Murthy, **P. Masih Das**, S. Ribet, C. Kopas, V.P. Dravid, A. Romanenko. *Developing a Chemical and Structural Understanding of the Surface Oxide in a Niobium Superconducting Qubit*. ACS Nano. (2022) 16:10.

[2]: X. Lu, D. Goronzy, C.G. Torres, **P. Masih Das**, M.J. Bedzyk, M.C. Hersam, J.M. Rondinelli. *Stability, Metallicity, and Magnetism in Niobium Silicide Nanofilms*. Phys. Rev. Mats. (2022) 6:064402.

[3]: **P. Masih Das**, M. Drndic. *In Situ 2D Field Effect Transistors with an Electron Beam Gate*. ACS Nano (2020) 14:6.

[4]: J.P. Thiruraman, **P. Masih Das**, M. Drndic. *Ions and Water Dancing through Atom-Scale Holes: A Perspective*

toward 'Size-Zero'. ACS Nano (2020) 14:4.

[5]: P. Masih Das, J.P. Thiruraman, M. Zhao, S. Mandyam, A.T.C. Johnson, M. Drndic. *Atomic-Scale Patterning in Two-Dimensional van der Waals Superlattices*. Nanotechnology (2020) 31:105302.

[6]: J.P. Thiruraman, P. Masih Das, M. Drndic. *Irradiation of Transition Metal Dichalcogenides using a Focused Ion Beam: Controlled Single-Atom Defect Creation*. Adv. Func. Mats. (2019) 30:1904668.

[7]: P. Masih Das, G. Danda, A. Cupo, W. Parkin, L. Liang, N. Kharche, X. Ling, S. Huang, M. Dresselhaus, V. Meunier, M. Drndic. *Controlled Sculpture of Black Phosphorus Nanoribbons*. ACS Nano (2016) 10:6.

○ Total of 32 peer-reviewed articles in Nano Letters, Nature Comm., Advanced Materials, ACS Nano, and Nanotechnology.

Skills

Techniques: Software/Hardware Product Development, Low-Temperature Device Physics, Superconducting Qubits, Electronic Transport Measurements, Qubit Fabrication, Superconducting Qubit Characterization, Wafer-Scale Nanofabrication (deposition, patterning, etching), Electron Beam Lithography (EBL), Transistor Characterization, Photolithography, Chemical Vapor Deposition (CVD), Physical Vapor Deposition (PVD), Raman/Photoluminescence Spectroscopy, Transmission/Scanning Electron Microscopy (TEM/SEM), Focused Ion Beam Irradiation (FIB), Thin Film Characterization, Atomic Force Microscopy (AFM), Cryogenic Systems.

Software: Qiskit, Python, Github, C, MATLAB, JMP, Java, COMSOL, LabVIEW, Adobe Illustrator, Adobe Photoshop, ImageJ, LaTeX, Abaqus, Xcode, Android Studio, Blender, Density Functional Theory Calculations.

Patents

62/308,897 (Filed): Black-Phosphorus-Based Molecular Analysis Devices 2017

8728578 (Granted): Chemical Synthesis for Graphene Sheets >1 Micron in Length 2014

Awards

Dissertation Completion Fellowship, University of Pennsylvania 2019

Elias Burstein Prize, University of Pennsylvania Physics Department 2019

Winner (Natural Sciences), University of Pennsylvania Ben Talks 2019

Honorable Mention, NSF Graduate Research Fellowship 2015-2016

Hodson Trust Merit Scholarship, Johns Hopkins University 2010-2014

Finalist, Intel Science Talent Search 2010

Selected Presentations

HRL Laboratories Materials Center Seminar, Malibu, CA (Nov) 2022

Superconducting Quantum Materials and Systems Center Seminar, Evanston, IL (Feb) 2021

Harvard University Materials Science Department Seminar, Cambridge, MA (Oct) 2020

Oak Ridge National Lab Seminar, Knoxville, TN (Feb) 2020

Enabling Quantum Leap Workshop, Philadelphia, PA (Sep) 2019

Density Functional Theory Summer School, Ithaca, NY (Jul) 2018

Graphene and Beyond: From Atoms to Applications, State College, PA (May) 2017

○ Total of 20 presentations at conferences, workshops, and seminars in the United States and Europe.

Professional Service

Journal Reviewer: ACS Nano, Carbon, Scientific Reports, Applied Physics Letters

Conference Organizer: 2019 Gotham-Metro Condensed Matter Meeting (New York, NY)

Additional Experience

Visiting Scientist, Franklin Institute (Philadelphia, PA) 2016-2018

○ Designed and participated in workshops for high school students with a focus on topics in academic research.

Director, Access Science Physics (Philadelphia, PA) 2014-2017

○ Led a team of 25 students in developing and performing weekly physics experiments in Philadelphia public schools.

Director, Jail Tutorial Project (Baltimore, MD) 2011-2014

○ Led a team of 40 students in tutoring mathematics and computer skills at the Baltimore City Detention Center.