

# Nirajan Mandal

nirajan.mandal@hotmail.com

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## EDUCATION

- **Purdue University**, West Lafayette, IN **2010-2018**  
Ph.D., Department of Physics and Astronomy.
- **Kenyon College**, Gambier, OH **2006-2010**  
B.A. Physics and Mathematics with concentration in scientific computing.

## WORK EXPERIENCES

- **Technology development (TD) module & integration yield engineer** **2018 - Present**  
Chemical mechanical planarization (CMP) team at **Intel Corporation**, Portland, Oregon  
As a layer owner, I am responsible for planar tool's health, processed wafer quality, process development and documentation. A significant portion of my job role is to collect data from the tools and wafers, analyze them and help my internal and external teams make decisions to improve yield.
- **Lecturer**, Purdue University for General Physics (PHYS 221) **Summer 2016**
- **Teaching Assistant (TA)**, Purdue University (PHYS 220, 221, 344, 522) **2010-2018**  
Online journal of medieval art and architecture
- **Tutor**, Kenyon College (PHYS110, PHYS135 and C++ programming) **2008-2010**

## TECHNICAL SKILLS

- **GitHub page with a portfolio:** <https://github.com/nirajan-mandal>
- **Programming:** C++ (data structure and MPI), Python (Numpy, Pandas, Scikit-learn, OpenCV), JMP, Matlab, LabVIEW, HTML, L<sup>A</sup>T<sub>E</sub>X
- **Artificial intelligence** TensorFlow, PyTorch, machine learning (regression, K-nearest neighbours, support vector machine, neural network, TensorFlow.js, Natural Language Processing (NLP))
- **Data Analysis/ Visualization:** Statistical Process Control (SPC), SQL-PathFinder, JMP, OriginPro, Igor, Maple, Mathematica, Minitab, gnuplot, Matplotlib
- **Design Software:** AutoCAD (fundamental), Photoshop, GIMP, Final Cut Pro., Audio Pro.
- **Optical Characterization:** Kerr rotation, micro-Raman spectroscopy, Variable Angle Spectroscopic Ellipsometer (VASE), infrared (IR) VASE, PhotoLuminescence (PL), absorption spectroscopy, optical tweezers, confocal microscopy
- **Other Characterization:** X-Ray Diffraction (XRD), electrical transport, Atomic-Force Microscopy (AFM), Electron Spin Resonance (ESR), Electron Nuclear Double Resonance (ENDOR), Vibrating Sample Magnetometer (VSM), Variable Temperature Insert (VTI)
- **Instrumentation:** Optical assembly/design, laser operation and maintenance, cryogenics (Liquid N<sub>2</sub> and He), high vacuum systems, Printed Circuit Board (PCB) design, RF electronics, machine shop (lathe and mill), light detection

## PROGRAMMING COURSES

- **MATH 218:** Data structures and program design (C++) **2008**
- **PHYS 218:** Dynamical system in scientific computing (C++) **2008**  
Solved ordinary and partial differential equations to simulate natural phenomena
- **SCMP 401:** Scientific computing seminar (C++) **2009**  
Ran simulations on a supercomputer using Message Passing Interface (MPI)

- Intro to TensorFlow for deep learning (UDACITY) 2021
- Proficient in **LabVIEW**. Used for data collection and instrument control
- **Self taught:** Python, machine learning, JMP, Matlab and HTML

## RESEARCH EXPERIENCES

- Designed, assembled and developed an optical Kerr rotation system. The setup is used to explore properties of topological insulators, magnetic thin films and heavy metals. Measurements can also be done at low temperature and low pressure. (Purdue University)
- Responsible for maintaining, troubleshooting and training new users for our micro-Raman spectroscopy facility. (Purdue University)
- **Kenyon College:** Responsible for operating and maintaining Frank C. Peiris's thin film optics lab. The major instruments in the lab were Variable Angle Spectroscopic Ellipsometer (VASE) and infrared (IR) VASE (2007-2010).
- **Ohio State University:** Upgraded ESR instrument (EMXplus by Bruker) to have angular dependence measurement capability. Used this to measure hyperfine splitting in  $P_1$  center defects in diamond. Mentor: P. Chris Hammel, Summer Research Opportunity Program (SROP) 2009.

## PUBLICATIONS

1. W. Park, X. Li, **N. Mandal**, X. Ruan, and Y. P. Chen, "Compressive mechanical response of graphene foams and their thermal resistance at the interface", Applied Physics Letters (APL) Materials, (2017)
2. K. Ramadoss, **N. Mandal**, X. Dai, Z. Wan, Y. Zhou, L. Rokhinson, Y. P. Chen, J. Hu, and S. Ramanathan, "Sign reversal of magnetoresistance in perovskite nickelates by electron doping", Phys. Rev. B, 94, 235124 (2016)
3. **N. Mandal**, F. C. Peiris, O. Maksimov and M.C. Tamargo, "Far-infrared dielectric functions and phonon spectra of  $\text{BexZn}_{1-x}\text{Te}$  alloys determined by spectroscopic ellipsometry", Solid State Comm., 149, 1698 (2009)
4. S. Wong, O. Kiowski, M. Kappes, J. K. N. Lindner, **N. Mandal**, F. C. Peiris, G. A. Ozin, M. Thiel, M. Braun, M. Wegener, and G. Freymann, "Spatially localized photoluminescence at 1.5 micrometers wavelength in direct laser written optical nanostructures", Adv. Material, 20, 4097 (2008)

## AWARDS & HONORS

- 1<sup>st</sup> place in graduate student poster presentation 2015  
Organized by Nanotechnology Student Advisory Council (NSAC), Purdue University, IN
- Physics ingenuity prize, Kenyon College, OH 2009  
Awarded by the department for creating a system to monitor online pressure of a vacuum chamber in the lab
- John H. Dunlap IV Scholarship, Kenyon College, OH 2008  
Awarded to two students by mathematics department for demonstrating excellence in programming and/or use of computer applications

## LEADERSHIP

- **President** of Nepali Society at Purdue University (NEPSAP) 2013-2014  
Oversaw and organized educational and cultural events
- **President of student government**, Budhanilkantha School, Kathmandu, Nepal 2003-2004  
Liaison between students, teachers and administration of the school

**LANGUAGES:** English, Nepali, Maithali (Native) and Hindi

**HOBBIES:** Raspberry Pi and photography