RAJESH KAPPERA

1051 11th Street, Apt 8 (615) 975 4242
Los Alamos NM 87544 raj.kappera@rutgers.edu

SUMMARY

- Electrical Engineer Graduate looking for full-time opportunity
- Currently pursuing **Ph.D. in Electrical Engineering** at Rutgers University, NJ
- **2 years Industrial experience as Research Engineer** in the R & D department of **EPV Solar, NJ**
- **Master of Science in Electrical Engineering** from Villanova University, PA
- **Fundamentals of Engineering** (FE/EIT) certification
- Good at **SEM, AFM, Raman, XPS, Photo and E-beam lithography**

EDUCATION

Doctor of Philosophy in Electrical Engineering GPA: **4.0/4.0**
Rutgers University, NJ Jan 2010 - Present

Master of Science in Electrical Engineering GPA: **3.89/4.0**
Villanova University, PA Dec 2008

Bachelor of Engineering in Electronics and Electrical Engineering
Osmania University, Hyderabad, India May 2006

PUBLICATIONS AND CONFERENCES

- **Axonal Alignment and Enhanced Neuronal Differentiation of Neural Stem Cells on Graphene-Nanoparticle Hybrid Structures**, Aniruddh Solanki, Sy-Tsong Dean Chueng, Perry T. Yin, ***Rajesh Kappera***, Manish Chhowalla, Ki-Bum Lee. Advanced Materials, vol. 35, iss. 38, pages 5477-5482, 2013
- **Solution Processed Layered Transition Metal Oxide Thin Films**, ***R. Kappera***, D. Voiry, D. Alves, M. Acerce and M. Chhowalla, 2012 MRS Symposium F: Oxide thin films for Renewable Energy applications
- **Large Scale Deposition of Transparent Conducting Oxides by Hollow Cathode Sputtering**, A. E. Delahoy, K. Jansen, P. Fabiano, ***R. Kappera***, S. guo, H. Li and S. Yang, 2011 MRS Symposium C: Advanced Materials Processing for Scalable Solar-Cell Manufacturing
- **Nanohole structures for efficiency enhancement in thin film photovoltaics**, ***R. Kappera***, W. Warrick and M. B. Tayahi, Photonics (ICP), 2010 International Conference, vol.1, no.1, pp.1-5, 5-7 July 2010 ICP.2010
- **Enhanced optical absorption in thin film solar cells by surface plasmons**, W. Warrick, ***R. Kappera*** and M. B. Tayahi, Photonics (ICP), 2010 International Conference, vol.1, no.1, pp.1-5, 5-7 July 2010 ICP.2010
- **VHF PECVD deposition of nc-Si – Material and Device properties**, A. E. Delahoy, G. Saraf, S. Guo, P. Delli Veneri, ***R. Kappera*** and L.N.J Rodriguez, 24th European Photovoltaics and Energy Conference 21-25 (2009), pp. 2860 – 2866

WORK EXPERIENCE

Faculty Guest Researcher, CINT, Los Alamos National Laboratory, Los Alamos, NM *Apr 2013 - Present*

***FOCUS**: Two dimensional materials, growth, properties and applications*

- **Exfoliation** of transition metal dichalcogenides
- **Solution processing** of layered transition metal dichalcogenides (MoS_2, WS_2, $MoSe_2$, WSe_2)
- Study of electrical properties of single layer materials by device fabrication through lithography
- Study of catalytic properties of single layer transition metal dichalcogenides
- Study of opto-electronic properties of layered materials

Doctoral Research Assistant, Electrical Engineering Dept., Rutgers University, NJ *Jan 2010 - Present*

***FOCUS**: Two dimensional materials, growth, properties and applications*

- **Chemical vapor deposition** of Graphene and Molybdenum disulfide
- **Solution processing** of Graphene Oxide, layered transition metal dichalcogenides (MoS_2, WS_2, $MoSe_2$, WSe_2) and their corresponding oxides (MoO_3 and WO_3)
- Study of electronic properties of thin films by depositing electrical contacts through **lithography**
- **Photoconductivity & Photoluminescence** of 2-D materials such as MoS_2 and WS_2
- Processing of thin film materials for enhanced efficiencies in **organic photovoltaics**
- Study of thin films such as graphene, graphene oxide and molybdenum disulfide for **biosensing applications**
- Study of graphene as an electrode material in **thick film energy conversion devices**
- Introduction of novel **quantum dots/hybrid nanostructures** to enhance opto-electronic properties of thin films
- Growth of **semiconducting nanofibers** of various materials through the process of electro-spinning
- Photocatalytic water splitting by employing transition metal oxide catalysts
- Efficient in SEM, AFM, Raman Spectroscopy and UV Vis spectroscopy

Teaching Assistant, Electrical Engineering Dept., Rutgers University, NJ *Aug 2010- Spring 2012*

Course: 14:332:336 Digital Electronics (Course, Lab), 16:332:361 Electronic Devices (Course, Lab)

- Conduct Recitations where lectures were reviewed
- Hold office hours in which students' queries were answered

Research Engineer, R & D Department, EPV Solar, Lawrenceville, NJ *June 2008 - Jan 2010*

Job Function: Current-Voltage (***IV***) Measurements, Quantum Efficiency (***QE***) Measurements, Accelerated Light Soaking (***ALS***) Measurements**,** data analysis and reports to enhance device properties

- Determined all **electrical and optical characteristics of thin film solar cells**
- Designed apparatus for IV measurements of various semiconductor devices
- Worked on various material etching such as Aluminum, Silicon, Zinc oxide, Tin oxide.
- Interfaced with R&D PECVD, TCO and device group to generate ideas for better product development
- Familiar with operation of various **Physical and Chemical vapor deposition (PVD, CVD) systems**
- Experienced in **Laser scribing** of solar modules

Research Assistant, Electrical Engineering Dept., Villanova University, Villanova, PA *Sep 2006 - May 2008*

Project – "**Mission and Sensor Fusion based Autonomous Control Development**"

This work was aimed at the development of a platform which can send path signals to autonomous vehicles to reach the target avoiding the obstacles on the path. This project was funded by the **Office of Naval Research**.

- Developed a fuzzy logic based **obstacle and collision avoidance algorithm**
- Validated system stability, survivability, and real-time collision avoidance of the **fuzzy logic based distributed control architecture** theoretically and through simulation
- Developed a **Multiple Input Multiple Output (MIMO) model** which allows the navigation computations to be multiplexed providing the capability to adapt to different environments and mission
- Integrated various hardware components and computer system configuration items to implement the algorithm for demonstration on **mobile robot platforms**

Project Lead, Autonomous Surface Vehicle Competition (ASVC), Orlando Florida *May 2007 - Aug 2007*

- Led a group of graduate and undergraduate students to build an autonomous surface vehicle
- Competition held by Unmanned Vehicle systems International (AUVSI), Office of Naval Research (ONR) and the Peninsula chapter of AUVSI at Orlando, Florida
- Won the **best presentation and best design award**

TECHNICAL SKILLS

- Programming Languages: **C, C++**
- Tools: **MATLAB, Simulink and Xylinx, Quartus II suite, MS OFFICE**
- Scanning Electron Microscopy, Atomic force microscopy, Raman spectroscopy, X-ray photoelectron spectroscopy, Photolithography, Electron-beam lithography, Focussed ion beam (FIB) patterning
- Operating System: Windows all versions, MAC OS, Linux/UBUNTU
- Others: Familiar with the hardware and software basic operations, installation and trouble shooting

COURSE PROJECTS

- Designed an **8 bit channelizer** in Simulink environment using Xylinx tool set
- Constructed **8 point and 16 point DFTs using FPGA principles and Xylink FFT**
- Case study on **Merck's® future R & D strategy** to help in strengthening market leadership - Applied concepts of Core – competency structure, Portfolio management, **Six sigma** technique, Gap analysis, new product ideation as business strategy; for integrating technology and Management in an effective way which will result as a competitive advantage for the company
- A visit to **inTEST Corporation**, NJ to build a model of their competency structure. Had discussions with their R&D manager and various personnel to know the details of the manufacturing processes and the products developed by inTEST. A report was prepared and a presentation was given about the company and their products

ACHIEVEMENTS and ACTIVITIES

- **Fundamentals of Engineering (FE) Certification**
- **Judge for North Jersey Regional Science Fair** at Rutgers
- **Teaching** and **Research assistantship** in ECE department at Rutgers and Villanova University
- **Tuition scholarship** for entire bachelors program as a reward for academic excellence
- Organized various technical and cultural festivals during undergraduate level
- Excellent **Time management** and **Leadership skills**