Kunal Jindal

kjkjindal.github.io • kjkjindal@gmail.com • +91 971-716-5476

Interests: Synthetic biology, Machine learning, High throughput genomics, Molecular Neurogenomics

EDUCATION AND TRAINING

Birla Institute of Technology and Science, Pilani, India   **2012-2017**

M.Sc. (Hons.) *Biological Sciences,* ***B.E. (Hons.)*** *Electronics and Instrumentation Engineering*

- GPA: 8.64/10.0 (3.45/4.0); Core Biology GPA: 9.52/10.0 (3.81/4.0)*
- Teaching Assistant, Recombinant DNA Technology, Spring 2016
- Summer Research Fellow, Indian Academy of Sciences, 2015
- Team Captain, NanoCrafters, BIOMOD 2015 at Harvard University
- Awarded 2nd Prize in Paper Presentation, APOGEE 2014

Training and Certifications

Deep Learning Specialization   **Aug 2017 - Present**

Deeplearning.ai, Coursera

- 5 course specialization in deep learning.
- Coursera Course Mentor   Starting Dec 2017
  Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization.

RESEARCH EXPERIENCE

Harvard Medical School   **June 2016 - June 2017**

Visiting Undergraduate Research Fellow, George Church Laboratory

- Developing Targeted In Situ Sequencing for Detection of RNA Transcripts in Tissues and Cells
  - Worked in a team of four to develop a protocol for targeted Fluorescent In Situ Sequencing (FISSEQ) of RNA transcripts.
  - Optimized individual enzymatic steps to amount in a 3-fold reduction in the total time required for the experiment.
- Towards Multiplexed Protein Detection using Targeted In Situ Sequencing
  - Conceptualized, piloted development of a new method for scalable, cost effective DNA-Antibody conjugation.
  - Adapted the in situ RNA sequencing method for multiplexed in situ protein detection using DNA barcoded protein binders.
- Developed a Programmable ThermoFluidic Cycler, along with a summer intern, for Automating In Situ Sequencing Library Preparations

Center For DNA Fingerprinting and Diagnostics   **Summer 2015**

IASc Summer Research Fellow, Computation and Functional Genomics Laboratory

- Designed and carried out a pilot study to analyze the ligand binding pocket of an Acyl-CoA Binding Protein, of the malaria causing parasite, *P. falciparum*.
- Computationally predicted key binding pocket residues using homology modelling.
- Expressed single residue mutants of the protein, for each identified residue.
- Measured loss of function in each using a ligand binding assay to quantify the functional importance of each residue in the ligand binding mechanism.

method used for GPA conversion to 4 scale: (GPA on 10 scale)(4/10)

SKILLS AND EXPERTISE

Programming Skills:
Python, TensorFlow, C, Java, Arduino

Molecular Biology Expertise:
In Situ Sequencing, Mammalian and stem cell culture, Confocal and Fluorescence microscopy, Flow Cytometry, FISH, Immunofluorescence, Protein Conjugation, Nanoparticle Synthesis, Plasmid and genomic DNA extraction, Western Blot, Southern Blot, Molecular cloning, Protein expression and purification, CD Spectroscopy, Site Directed Mutagenesis

Extensive Software Proficiency:
COMSOL Multiphysics, Agilent GeneSpring GX, SnapGene, GraphPad Prism, Adobe Illustrator, Adobe Photoshop.

TEACHING EXPERIENCE

Dept. of Biological Sciences, BITS Pilani   **Spring 2016**
Teaching Assistant, Recombinant DNA Technologies
- Assisted in development of course content.
- Assisted in conducting tutorials, quizzes, guided students with assignment problems.
- Assisted with evaluation of tests and helped conduct practical sessions on SnapGene, molecular biology software.

PROJECTS

A Novel Plug n Play MEMS-Based DNA Microarray   **2016**
- Designed a Micro-Electromechanical (MEMS) DNA microarray in COMSOL Multiphysics software that employees resonant mass sensors to enable label free detection of RNA transcripts.
- Designed circuitry to interface it with a digital device such as a USB port.
- Presented the project at the COMSOL Conference 2016, Boston.

Analysis of gametocytes specific microarray data of *Plasmodium Falciparum* from patient samples. Spring 2016
- Analyzed microarray expression data of *P. Falciparum* obtained from patient samples.
- Investigated differential gene expression across sexual and ring stage of the organism to identify genes specifically expressed in the sexual stage.
- This would help design drugs targeting the sexual stage of the parasite, which is specifically responsible for the spread of malaria.

Universal Biosensor Design, BIOMOD 2015   **2014-2015**
- Formed and led my university's team of 8 members for BIOMOD 2015, Harvard's annual nano-biotechnology competition for undergraduates.
- Conceptualized a modular, cost effective method to rapidly develop new biosensors for a variety of targets.
- Designed and carried out experiments, organized team meetings, helped design wiki page and project video for the competition.

method used for GPA conversion to 4 scale: (GPA on 10 scale)(4/10)*

- Coordinated collaborations with scientific establishments both inside and outside the university.
- The team was placed in the silver category at the event
- Weblink: https://nanocraftersbits.github.io/

Modular Microbial Fuel Cell based photosynthetic bioelectric wall panels   **Fall 2014**
- Researched current state-of-the-art Microbial Fuel Cell (MFC) based power generation systems to identify various bottlenecks deterring the mass adoption of MFCs.
- Conceptualized and proposed a modular MFC based power generating wall panel to harness autotrophic bacterial respiration to convert light energy into electricity

INTERNSHIPS

505 Army Base Workshop, New Delhi, India   **Summer 2014**
Summer Intern
- Conceived and conceptualized a virtual reality headset based 360° vision system for the tank driver of a T-72 tank.
- In a team of four interns, worked on strategic camera placement on the vehicle's chassis and preliminary implementation of the image processing software.

PUBLICATIONS

- *A plug n play MEMS based DNA microarray.* **K. Jindal**, V. Grover, B. Nayak. COMSOL Conference 2016

method used for GPA conversion to 4 scale: (GPA on 10 scale)(4/10)*