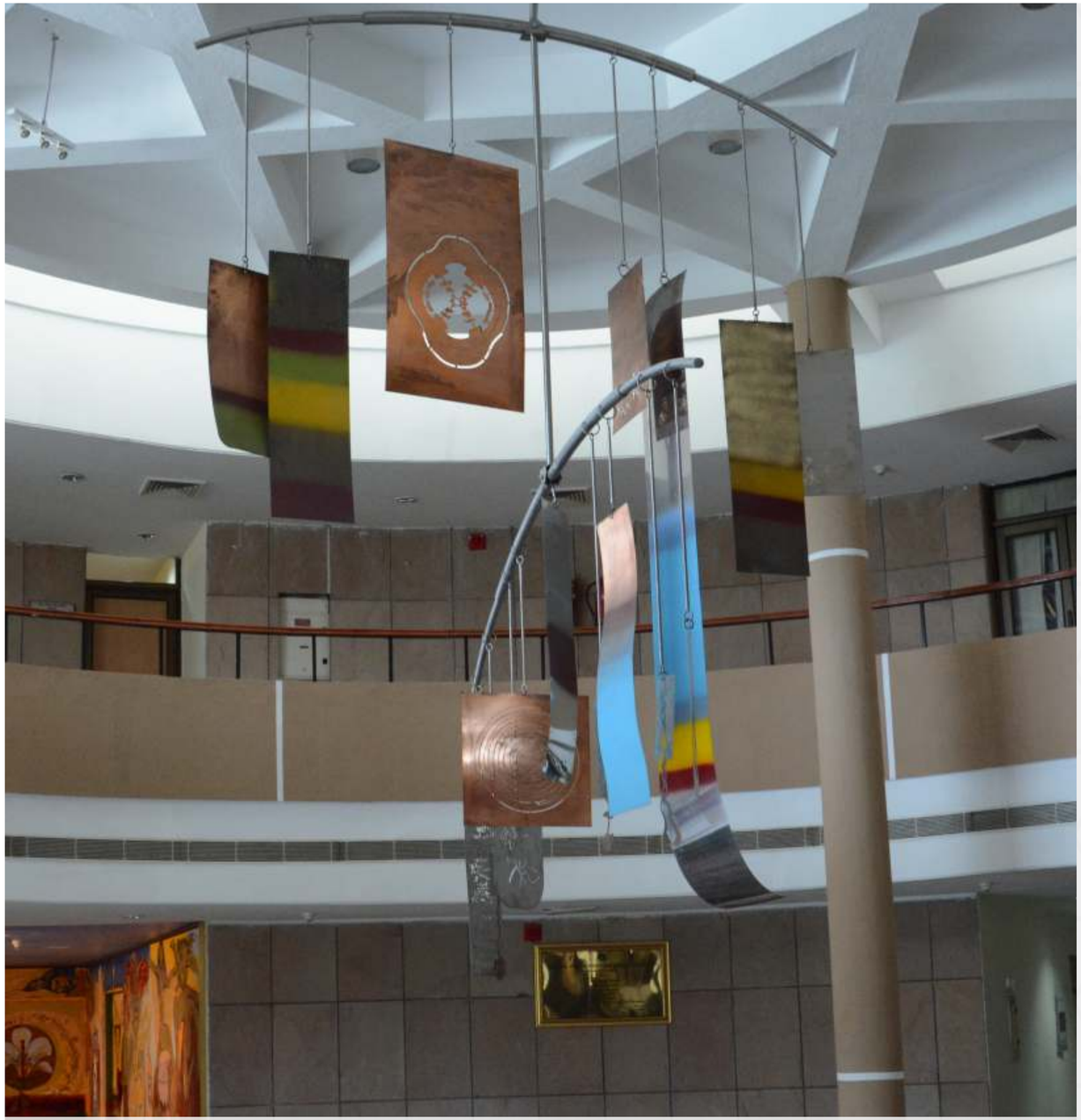

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NIPGR

NATIONAL INSTITUTE OF PLANT GENOME RESEARCH

Imagine Invent Inspire

NIPGR

National Institute of Plant Genome Research is an autonomous research institute funded by the Department of Biotechnology, Government of India. The researchers at NIPGR work on various aspects of basic and applied plant molecular biology. NIPGR also has vibrant doctoral and postdoctoral programs through which it is involved in training the next generation of plant biologist.

Dr. Ramesh V. Sonti
Director, NIPGR

The National Institute of Plant Genome Research (NIPGR) is a state of the art laboratory for research on basic and applied plant molecular biology. The institute has witnessed exponential growth in its research programs since its inception over 19 years ago and has become well recognized both nationally and internationally. The researchers at NIPGR work on various aspects of plant molecular biology ranging from genome analysis, development, adaptation to biotic and abiotic stresses, computational biology, nutritional genomics, etc. Currently the Institute has 29 scientists who are leading independent groups covering cutting-edge research in these areas. NIPGR also has more than 200 PhD students, post-doctoral fellows and post-MSc students who are working on various research projects. From its inception, NIPGR has been home to talented students, post-doctoral fellows, technical staff and vibrant faculty. A testament to this is the large number of awards as well as fellowships of various science academies that have been bestowed on researchers working in the institute. NIPGR is also constantly upgrading its research infrastructure in order to effectively pursue its twin goals of conducting high quality basic research and in seeking its application towards product development.

RESEARCH AREAS

Genome analysis and molecular breeding

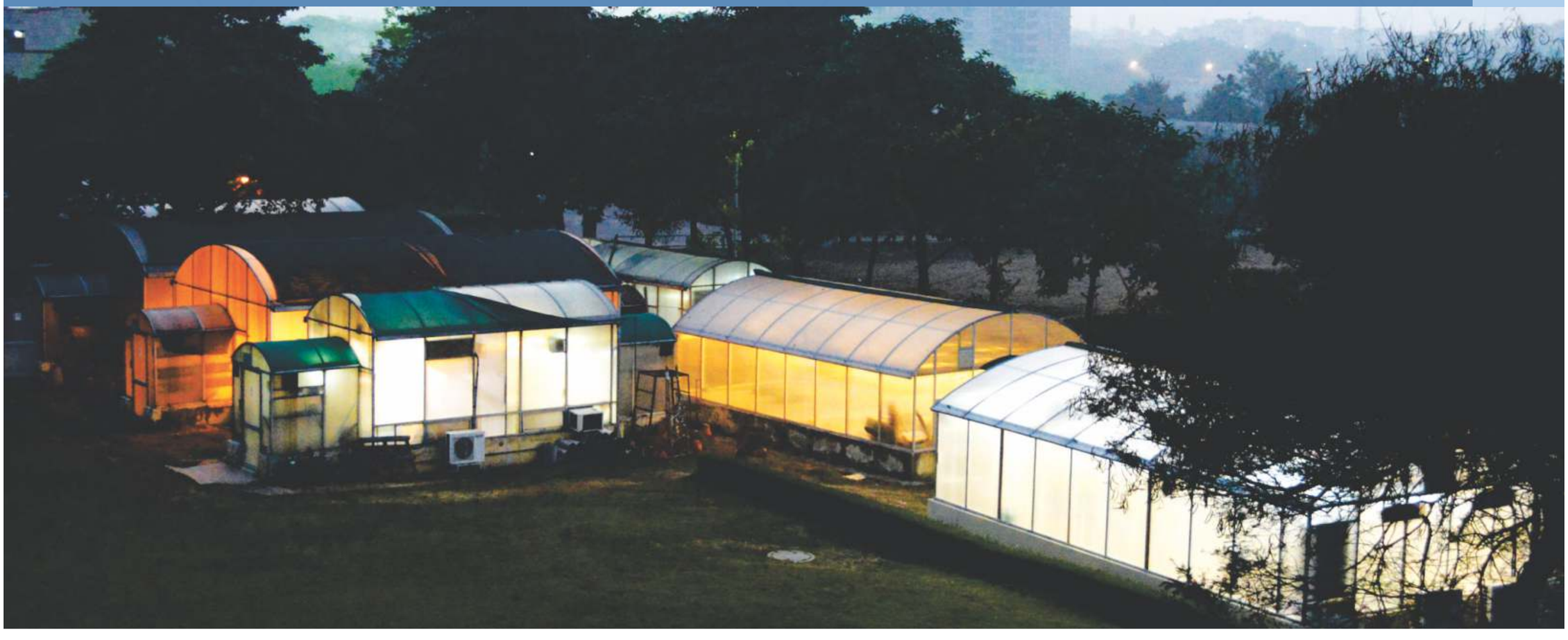
Development and signaling

Plant responses to abiotic stresses

Computational biology

Plant-microbe/insect interactions

Nutritional traits in crops



GENOME ANALYSIS AND MOLECULAR BREEDING

DEBASIS CHATTOPADHYAY, PhD

Staff Scientist
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The lab focuses on two areas of plant biology, namely, improvement of tolerance to abiotic stresses (i.e. drought and salt) in higher plants by improving root traits, and genome sequencing and analyses. Studies include mechanism of root growth under abiotic stress and intend to improve abiotic stress tolerance in plant by improving root system architecture. We have sequenced and analysed genomes of cultivated and wild chickpeas and are using these assemblies to map the quantitative trait loci responsible for root development under water deficit.

MANOJ PRASAD, PhD

Staff Scientist
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The lab is interested in delineating the abiotic and biotic stress tolerance of foxtail millet and tomato, respectively. In abiotic stress perspective, molecular characterization of several genes and transcription factors is being performed. In biotic stress, the lab is working on dissecting the molecular mechanism of natural tolerance of tomato to leaf curl disease. The lab applies a holistic approach, integrating the omics technologies to address the research questions.

SABHYATA BHATIA, PhD

Staff Scientist
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The lab focuses on the structural and functional genomics of legumes with the aim to understand and analyse genomes in order to provide new tools to enhance plant capacity. The group is involved in the NGS based sequencing of the genomes and transcriptomes of chickpea and lentil, leading to high throughput SNP discovery and genotyping for use in the construction of saturated genetic linkage maps and identification of QTLs. The lab also works on dissecting the molecular mechanisms regulating seed development and nodule formation in chickpea.

SWARUP K. PARIDA, PhD

Staff Scientist
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The lab is interested in developing novel concepts on various genetic markers designing and diverse integrated genomics-assisted breeding strategies for rapid quantitative dissection of complex seed yield and seed quality component traits aimed towards genetic enhancement of rice and chickpea. Our major goal is to employ multiple genome-wide integrated genomic strategies for effective delineation and introgression of novel superior trait-associated genes and favourable natural alleles to produce high-yielding crop varieties enriched with quality traits.

DEVELOPMENT AND SIGNALING

AASHISH RANJAN, PhD

Staff Scientist
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The lab is interested in dissecting the genetic basis of leaf development in crop plants that can be exploited towards improving photosynthetic efficiency. Another important focus of the lab is investigation of the genetic basis of plant developmental responses to environmental signals. The lab is using genomics, molecular biology and molecular breeding tools to address the research questions.

ALOK KRISHNA SINHA, PhD

Staff Scientist
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The group is trying to understand the complexity of signals being transduced through mitogen activated protein kinase (MAPK) cascade in plants. Rice and Arabidopsis are two-model systems that are used to understand this complex signalling cascade with an aim to develop stress resilient crop plants with better yield.

AMAR PAL SINGH, PhD

Staff Scientist
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The lab is interested to understand the context specific developmental plasticity of root system architecture under the limiting environmental conditions such as nitrogen and iron availability and their interaction with the developmental signals such as auxin and brassinosteroids using Arabidopsis and tomato as model systems. The major goal of the laboratory is to reprogram root system architecture by using genetic tools into an adaptive root system under limited nutrient availability.

ANANDA K. SARKAR, PhD

Staff Scientist
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The laboratory is interested to understand molecular regulation of plant meristem maintenance, and root and shoot architecture. The lab explore the role of genetic and epigenetic factors, and small RNAs in shaping plant architecture (mainly root) in Arabidopsis and crops (rice) through functional genomics and mutational studies. Transgenic and genome editing approaches are used to engineer plant architecture for improving agronomic trait.

DEVELOPMENT AND SIGNALING

ASHVERYA LAXMI, PhD
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The lab is working on model plant Arabidopsis to understand the molecular basis of plant plasticity by in-depth study of interaction between various signal transduction pathways. Understanding the molecular mechanism of signaling interaction will also fetch resources for gene editing and plant genetic engineering to improve various agronomic traits in crop plants.

JITENDRA KUMAR THAKUR, PhD
Staff Scientist
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The lab is focussing on three major research programs; (i) understanding of functioning of plant Mediator complex, (ii) epigenetic regulation of flowering and seed development and (iii) characterization of anti-candida activities from different plants.

PINKY AGARWAL, PhD
Staff Scientist
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To address the dilemma of providing food to an increasing population, the lab works on the molecular aspects of rice seed/grain development with particular emphasis towards understanding the transcriptional networks operating during the process. The aim is to raise plants with an increased seed size and nutritional content. To achieve this, genomics, transcriptomics and proteomics techniques are being used.

PLANT RESPONSES TO ABIOTIC STRESSES

AMARJEET SINGH, PhD
Staff Scientist
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The lab is interested in deciphering key signaling networks such as Ca^{2+} signaling and lipid signaling, triggered in response to abiotic stress including drought, salinity and oxidative stress, to improve the trait like stress tolerance and productivity in crop plants like rice and chickpea. The lab is also interested in understanding the molecular mechanism of potassium (K^+) uptake and homeostasis under low-K^+ availability conditions in crucial crop plants.

JAGADIS GUPTA KAPUGANTI, PhD
Staff Scientist
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The lab investigates the role of nitric oxide in plant growth, development and stress, with a particular focus on the signalling functions of NO and reactive oxygen species (ROS) during the release of cells from hypoxic stress to reoxygenation in roots subjected to flooding in the model plant species such as chickpea, tomato and Arabidopsis. The lab also investigates the role of photorepiratory metabolism in plant resistance against pathogen infection. Biochemical, molecular and physiological techniques are used to investigate the above mentioned questions.

JITENDER GIRI, PhD
Staff Scientist
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The lab's focus is on finding novel genes and understanding their functions in cellular signaling in response to limiting Phosphorus (P) conditions. Plants activate a diverse set of responses to face P scarcity and consequently alter physiological, biochemical and developmental processes. We are targeting P solubilizing enzymes, membrane remodeling genes and root development to improve resource acquisition and utilization in rice and chickpea. The lab employs modern tools of genomics like transcriptomics, metabolomics, phenomics, transgenesis and gene editing to pinpoint candidate genes for improving plant performance in low P input system.

MANOJ MAJEE, PhD
Staff Scientist
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Research in the laboratory centers around studying molecular mechanism of seed germination vigor, seed longevity and seedling emergence using molecular genetics and biochemical approaches. Currently, the Lab focuses are i) Protein Repairing Enzymes [Protein L ISO-ASPARTYL METHYLTRANSFERASE(PIMT), Methionine Sulfoxide Reductase (MSR)]; ii) Proteolytic Pathways [26S/Proteasome pathway] and iii) Protective Metabolites [Inositols and RFOs] that contribute in achieving high germination vigor and maintain viability for prolonged time.

PLANT RESPONSES TO ABIOTIC STRESSES

NIRANJAN CHAKRABORTY, PhD
Professor of Eminence
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The research in the laboratory is aimed at elucidation of the molecular circuitry used by plants in response to environmental stress. This enables the identification of key components which would help in their targeted manipulation in transgenic plants. Lab efforts involve utilization of a repertoire of approaches, which include physiochemical, proteomic and genomic tools. The lab's research interest can be grouped under two thrust areas: stress proteomics, and gene expression and regulation.

SALONI MATHUR, PhD
Staff Scientist
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The mandate of the laboratory is to elucidate the regulatory networks during heat stress in cultivated tomato. To better understand the evolution of heat tolerance response, a systems-level multi-omics approach has been initiated with major focus on non-coding RNAs- and epigenetic-mediated pathways.

PLANT-MICROBE/INSECT INTERACTIONS

GOPALJEE JHA, PhD
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The lab is interested in understanding the molecular intricacies of rice-Rhizoctonia interactions and focus on utilizing multipronged approach to control sheath blight disease of rice. Beside this, the lab also study the molecular basis of bacterial mycophagy and on-going battle between endophytic microbes (microbe-microbe interactions) to identify novel antifungal as well as antimicrobial compounds to control important plant diseases.

JYOTHILAKSHMI VADASSERY, PhD
Staff Scientist
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The lab has two major focus a) Mechanisms underlying plant perception of insect attack with emphasis on role of calcium signaling in perception of herbivory. The lab uses Arabidopsis and tomato as model plants and study its interaction with generalist insect, *Spodoptera litura.* b) Mechanisms of plant-microbial symbiont recognition. The lab uses Arabidopsis and plant growth promoting fungi, *Piriformospora indica* as model systems.

COMPUTATIONAL BIOLOGY

GITANJALI YADAV, PhD
Staff Scientist
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The lab is using knowledge based synthetic phytochemistry to explore new models of chemical modularity and phytomedicine. This involves integration of functional genomics with structural bioinformatics and machine learning approaches to predict the diversity of combinatorial products that can be generated by the plant Chemical Lego-Kit.

SHAILESH KUMAR, PhD
Staff Scientist
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The lab is dedicated to develop useful databases and webserver for plant research. Another area of interest is to develop automated pipelines and tools for the analysis of high throughput genomics data, generated by Next Generation Sequencing (NGS) technologies.

PRAVEEN VERMA, PhD
Staff Scientist
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The laboratory is interested in understanding the biology of plant-microbe interaction in crop plants. One area of our research is on the economically important fungal diseases of chickpea and wheat. Using genetic and molecular tools, we intent to identify host genes involved in immunity and pathogen virulence, especially secreted effectors.

RAMESH V. SONTI, PhD
Director
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The laboratory focuses on understanding the mechanisms of attack and defence in the interaction between plants and their pathogens. The model is the interaction between the *Xanthomonas oryzae* pv. oryzae (Xoo) and rice. A major focus of current research is to identify the rice functions that are involved in induction of innate immunity and Xoo effector proteins that work inside rice cells to suppress innate immune responses. A rice variety, called Improved Samba Mahsuri that has been developed by the lab in collaboration with the Indian Institute of Rice Research exhibits excellent resistance against Xoo and has been released for commercial cultivation.

PLANT-MICROBE / INSECT INTERACTIONS

SENJUTI SINHAROY, PhD
Staff Scientist
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The lab investigates the basic molecular mechanism of root nodule symbiosis in legumes. The lab is especially interested in understanding the genetic differences that cause the difference in nitrogen- fixation efficiency between legumes. The goal of the lab is to increase the nitrogen fixation efficiency of poor nitrogen-fixing legumes.

SENTHIL-KUMAR MUTHAPPA, PhD
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The lab is interested in two major aspects of plant biology, understanding stress interaction and combined stress responses, and nonhost disease resistance of plants against pathogens. The research team employs virus-induced gene silencing (VIGS) as a tool to investigate the functional relevance of candidate genes.

SUBHRA CHAKRABORTY, PhD
Staff Scientist
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The laboratory focuses on stress genomics in plants with specific emphasis to fungal pathogenicity. Oxalic acid is a potent elicitor in fungal pathogenicity in many crop plants. The lab developed fungal resistant transgenic tomato plants that express oxalate decarboxylase. The current interest is to unravel the role of oxalate decarboxylase in fungal tolerance. In addition, resistant gene candidates and defence mechanism of plants in response to fungal wilt are being explored. In addition, the lab also focuses on two more areas of research, nutritional genomics and enhancing self-life of fruit and vegetable.

NUTRITIONAL TRAITS IN CROPS

NAVEEN C. BISHT, PhD
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Brassica crops play an important role in global agriculture and human health. In the quest to improve flavour and nutritional qualities of Brassica crops and to boost plant protection, the major thrust area of the laboratory is to understand the molecular-genetic and biochemical basis of key primary and secondary metabolites in Indian oilseed mustard. Additionally, the lab is also investigating the key signalling intricacies involved in plant growth and development and in responses to various environmental cues in Brassica crops.

ASHUTOSH PANDEY, PhD
Staff Scientist
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The laboratory's broad research focus is to understand molecular basis of plant secondary metabolism and to use developed knowledge in metabolic engineering of crop plants (banana and chickpea) for enhancement of the content of health beneficial secondary metabolites.

ASIS DATTA, PhD
Distinguished Emeritus Scientist
Founder Director
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Main theme of the laboratory is improving nutritional status of the crops like potato; the lab is specifically interested in understanding of N-acetylglucosamine signaling and catabolic pathway in human and plant pathogens. In addition, the lab is also interested in development of fungal resistant transgenic tomato, soybean and grass pea and also aim to improve self life of fruits and vegetables.