

RECIPIENTS OF INSA MEDAL FOR YOUNG SCIENTISTS- 2021

1. **Dr Mohd Asgher** (10.04.1987), PhD, School of Biosciences and Biotechnology, Department of Botany, Baba Ghulam Shah Badshah University, Rajouri (J & K).

Dr. Mohd Asgher has carried out excellent work on the role of heavy metals and signaling molecules in plant physiology using cultivated and medicinal species. In particular, his research on ethylene optimization using sulphur supplementation for augmenting photosynthesis and growth under cadmium stress can be used for developing heavy metal tolerant genotypes. He has also shown that the toxicity of arsenic may be reduced by using H₂O₂ as a signaling molecule. His research on reactive oxygen species (ROS) in *Valeriana wallichii*, an important medicinal herb of the Himalayan region, provides insights into amelioration of oxidative stress and improving reproductive performance.

2. **Dr Mrigya Babuta** (17.10.1987), PhD, Beth Israel Deaconess Medical Center and Harvard Medical School, Massachusetts, USA.

Mrigya Babuta has identified novel molecules in a new pathway for phagocytosis in the protozoan parasite *Entamoeba histolytica*. Her work is the first detailed molecular study on phagocytosis in this organism and has important implications for understanding parasite virulence and disease.

3. **Dr Anjana Badrinarayanan** (15.08.1986), PhD, National Centre for Biological Sciences (TIFR), Bengaluru.

Anjana Badrinarayanan has applied novel approaches to make novel fundamental findings on how bacterial cells maintain genome integrity and repair DNA under conditions of stress. These have future implications for development of new strategies to combat infection.

4. **Dr Agnid Banerjee** (09.02.1988), PhD, TIFR CAM, Bengaluru.

Dr Agnid Banerjee has made significant contributions to the study of strong unique continuation property for fractional parabolic equations and sublinear parabolic equations and higher regularity of free boundary in the parabolic Signorini problem.

5. **Dr Anirban Basak** (30.01.1986), PhD, International Centre for Theoretical Sciences, Tata Institute of Fundamental Research, Bengaluru.

Dr Anirban Basak has made a distinguished beginning in what promises to be an outstanding research career in the theory of Random Matrices. His work on the sharp dependence of the invertibility property of a sparse matrix, on a specific relationship between its sparsity parameter and the order, is very significant .

6. **Dr Haritha Bollinedi** (23.07.1987), PhD, Division of Genetics, Indian Agricultural Research Institute (IARI), New Delhi.

Dr Haritha Bollinedi has made important contributions by analysing technical complexities in molecular events required for crop improvement by transgenic approaches. Her work on molecular characterization of provitamin A enriched golden rice lines, identification of stable donors and QTLs for Fe and Zn, analysis of genetic variation in starch composition of rice endosperm and identification of novel LOX3 null genotypes, are important for addressing the global challenges of hidden hunger, obesity and type-2 diabetes.

7. **Dr Dhiman Chakravarty** (11.03.1988), PhD, Bhabha Atomic Research Centre, Mumbai.

Dr. Dhiman Chakravarty has done significant work in unravelling the underlying mechanisms involving specific Mn-catalase for overcoming environmental stresses especially salt/desiccation stress in the agriculturally important nitrogen fixing cyanobacterium *Anabaena* having immense potential for suitable biotechnological applications.

8. **Dr Aravind Kumar Chandiran** (24.06.1986), PhD, Department of Chemical Engineering, Indian Institute of Technology, Chennai.

For designing new materials for various optoelectronic, and (photo)electrochemical applications, and realizing air- and moisture-stable lead-free double/vacancy-ordered perovskites.

9. **Dr Shouvik Das** (02.01.1990), PhD, Pulse Research Lab, Division of Genetics, Indian Agricultural Research Institute (IARI), New Delhi.

Dr. Shouvik Das has made important contributions to developing large-scale genomic resources and efficient genotyping strategies for rapid quantitative dissection of complex traits in chick pea. He delineated promising major genomic loci governing flowering time, pod number and seed weight for genetic improvement of chickpea.

10. **Dr Debdip Ganguly** (20.10.1986), PhD, Department of Mathematics, Indian Institute of Science Education and Research, Pune.

Dr Debdip Ganguly has made important contributions to a broad swath of areas: Geometry and Analysis with heat kernels and Green's functions in Riemannian Manifolds. His studies on the Liouville theorem for Schrodinger operators and more recently, on hyperbolic spaces are of high quality .

11. **Dr Eshan Ghosh** (07.07.1988), PhD, Department of Drug Design and Pharmacology, Faculty of Health and Medical Sciences, Copenhagen, Denmark.

Dr. Ghosh's work focused on understanding the interaction of G protein-coupled receptors (GPCRs) with their regulatory proteins called β -arrestins (β arrs), and for modulating the functional outcomes of this interaction. He developed synthetic

antibody fragments that selectively bind β -arrestin2 but not β -arrestin1, which could be used to selectively inhibit GPCR endocytosis without altering their signaling outcomes, thereby allowing a clear dissociation of endocytotic and signalling functions of β -arrestin2.

12. **Dr Najmul Haque** (05.06.1986), PhD, National Institute of Science Education and Research (NISER), Bhubaneswar.

For his outstanding work on QCD thermodynamics. He was the first to calculate the QCD thermodynamics at finite chemical potential within resummed perturbation theory (pt) up to the maximum possible loop-order (three-loop order). Three-loop HTLpt thermodynamics set a new milestone in the resummed perturbative framework in the field of theoretical nuclear physics and specifically heavy-ion physics.

13. **Dr Bharath Holla** (02.02.1986), MD, Department of Integrative Medicine, National Institute of Mental Health and Neuro-Sciences (NIMHANS), Bengaluru.

Dr. Holla's research is on studying vulnerability risks in children of parents with alcohol use disorder, as well as treatment response biomarkers. Graph-theoretical modeling of functional brain networks showed that developmentally relevant disruptions at critical brain regions sub-serving cognitive, affective, and sensorimotor processes. Recently, he developed the Indian brain templates for ages 6 to 60 years. These will be a valuable resource for neurologists, neurosurgeons, psychiatrists and neuroscientists that provide reference maps for areas of interest in individual patients with neurological disorders like strokes, brain tumors, and dementia.

14. **Dr Amit Jaiswal** (27.09.1986), PhD, Indian Institute of Technology Mandi, Mandi.

Dr. Amit Jaiswal is acknowledged for his innovative work on the development of gold nano-rattle, embedded in a shell structure as a multi-modal platform for biological sensing and theranostic applications. By bringing about a control on the shape and size of the embedded nano-rattle to tune the NIR plasmonic response and using the silica shell for SERS imaging, these nano-particle assemblages have been effective as the stimuli responsive nanomaterial for drug delivery and photothermal therapy.

15. **Dr Anshuman Kumar** (01.11.1986), PhD, Indian Institute of Technology, Bombay.

For his exceptional research which has fundamentally influenced the understanding of novel optical phenomena in two dimensional quantum materials as well as artificially engineered photonic structures called metamaterials.

16. **Dr Rajni Kumari** (01.10.1989), PhD, Department of Cell Biology, Albert Einstein College of Medicine, New York.

Dr. Kumari worked on the role of genes critical for p53 tumor suppressive functions under metabolic stress and found caspase-10 as one of the significantly upregulated p53-target genes. This has the potential for exploiting metabolic stress and caspase-

10-ACLY regulation axis with therapeutic strategies for progression prevention and cancer interception.

17. **Dr Santosh Kumar Kuncha** (01.04.1990), PhD, Centre For Cellular And Molecular Biology, Structural Biology Laboratory, Hyderabad.

Dr. Kuncha has worked on how nature maintains proteome homeostasis by the use of the enzyme D-aminoacyl-tRNA deacylase for proofreading during protein biosynthesis. During the present COVID-19 pandemic, he has also contributed to the development of a new RNA-independent mode of SARS-CoV-2 diagnosis.

18. **Dr Biplab Maji** (26.01.1987), PhD, Indian Institute of Science Education and Research Kolkata.

For his significant contributions to greener and sustainable organic synthesis using earth abundant metal catalysts.

19. **Dr Venkata Vamsee Aditya Mallajosyula** (27.09.1986), PhD, Institute for Immunity, Transplantation and Infection, Stanford University, California.

Dr. Vamsee Mallajosyula has made significant contributions in designing influenza immunogen, which was the basis for development of universal flu vaccines. Subsequently, he extended these designs to other subtypes and constructs. He also developed stem-domain fragments from various strains of H1 and H3 HA that could be expressed as soluble trimeric proteins in *E. coli*.

20. **Shri Nitesh Mishra** (08.01.1993), MSc, All India Institute of Medical Sciences, New Delhi.

Mr. Nitesh is continuing his PhD work in the field of HIV vaccine design. He made a detail presentation on identification of HIV-1 infected infants with potent anti-HIV-1 plasma broadly neutralizing antibodies and understanding the viral features that are responsible for generation of such potent plasma Abs. He explained that plasma Abs targeting the top of the viral spike are common in infants of Indian origin. His work has the potential to be an important step in the field of HIV-1 vaccine for assessing polyvalent vaccine candidates. He has very good publications in International Journals of high impact factor including Nature Communications (2020).

21. **Dr Abhishake Mondal** (02.04.1987), PhD, Indian Institute of Science, Bengaluru.

For developing new classes of molecular magnets and demonstrating photomagnetic spin-state switching in a variety of transition metal complexes and polymers.

22. **Dr Tridib Kumar Mondal** (15.04.1986), PhD, Geological Studies Unit, Indian Statistical Institute Kolkata.

For his original contributions towards elucidating the tectonic processes operative at the time of cratonization of the Archean greenstone granite belts, through innovative use of the field structures, micro-structures, anisotropic magnetic susceptibility

(AMS) and paleo-stress determinations. His work has practical significance in understanding the evolution of auriferous lodes in shear zones.

23. **Dr MD Nasim** (15.01.1987), PhD, Department of Physics, Indian Institute of Science Education and Research, Berhampur, Odisha.

For his outstanding work, towards understanding the Quantum Chromodynamics (QCD) phase diagram using STAR data. This has a long lasting impact on the quark-gluons plasma (QGP) program.

24. **Dr Praneeth Kumar Netrapalli** (20.07.1986), PhD, Microsoft Research, Bengaluru.

Dr. Praneeth Kumar Netrapalli is recommended for his copious and excellent contributions to optimization algorithms for machine learning, in particular for nonconvex optimization and nonconvex-nonconcave min-max optimization in order to address issues in an adversarial framework.

25. **Dr Vamsi Pritham Pingali** (02.06.1987), PhD, Department of Mathematics, Indian Institute of Science, Bengaluru.

Dr Vamsi Pritham Pingali has made significant contributions to certain differential geometric aspects of vector bundle theory. He formulated a novel vector bundle version of the Monge- Ampère equation which gave differential-geometric interpretation of the stability of a certain class of bundles. He also proved a Kobayashi-Hitchin correspondence for this equation in the case of vortex bundles. His work on providing interesting evidence for Griffiths's conjecture on positivity criteria for ampleness of Hermitian holomorphic vector bundles is noteworthy.

26. **Dr Lakshmi Narayan Ramasubramanian** (19.05.1986), PhD, Indian Institute of Technology Delhi, New Delhi.

Dr Lakshmi Narayan Ramasubramanian has made significant contributions in the development of bulk metallic glass composites which have very high strength and at the same time high toughness. By following a new method of laser beam modulation, he has generated superior microstructures in laser additive manufactured objects.

27. **Dr Kabir Ramola** (03.05.1986), PhD, Tata Institute of Fundamental Research, Hyderabad.

For his outstanding contributions to several areas of Statistical Physics. His work elucidates how cooperative phenomena arise in interacting systems, both in and out of equilibrium, focusing on phenomena such as condensation in lattice gases, jamming and glassy behavior in athermal systems, and clustering and phase separation in locally driven systems.

28. **Dr Chinmay Saha** (05.05.1986), PhD, Genome Science School of Interdisciplinary Studies, University of Kalyani, Nadia.

Dr Chinmay Saha has worked on interaction between rice, JGTA-S1 and its endosymbiotic bacteria. JGTA-S1 was amongst the endophytes isolated from the cattail which grows in nitrogen-free media and is positive for dinitrogen reductase gene *nifH*. JGTA-S1 shows a dimorphic change from yeast to filament form when it is near or inside the rice plant. In its filament form JGTA-S1 interacts with bacteria. These are interesting findings as eukaryotes cannot fix nitrogen. Dr. Saha and others for the first time suggested that JGTA-S1 not only increases nitrogen uptake in plants but also fixes nitrogen.

29. **Shri Manmohan Sharma** (28.05.1989), MSc, International Centre For Genetic Engineering and Biotechnology (ICGEB), New Delhi.

Shri Sharma's work has provided the biochemical validation of plasmodium phenylalanine tRNA synthetase enzyme as a drug target for the highly potent series of anti-malarial compounds (BRD) that have the potential to become the next-generation antimalarials. His work has shown that structure-based small-molecule design strategy can generate potent inhibitors not only for malaria parasites but also against other eukaryotic pathogens.

30. **Dr Akanksha Singh** (29.04.1987), PhD, Division of Crop Protection and Production, CSIR-Central Institute of Medicinal and Aromatic Plants, Lucknow.

Dr Akanksha Singh has made important contributions to promoting and understanding the mechanism of protection of chickpea and rice against abiotic stress by rhizosphere associated microbes. She identified the anti-virulence potential of phytochemicals, like thymol oil in controlling bacterial blight in rice by inhibiting biofilm formation. In chickpea, she demonstrated the biocontrol activity of *Trichoderma* against collar rot, through redox homeostasis. Her work on the protective effect of specific anti-oxidants on promoting root colonization by rhizosphere bacteria is noteworthy.

31. **Dr Abhishek Sinha** (12.03.1987), PhD, Department of Electrical Engineering, Indian Institute of Technology Madras, Chennai.

Dr. Abhishek Sinha is recommended for his contributions to stability and optimality problems in wireless and content distribution networks, inclusive of issues such as robustness in adversarial settings using rigorous performance metrics like competitive ratio and regret functions. It includes many classical problems like routing in networks, mobile computing and caching in realistic dynamic settings.

32. **Dr Saloni Sinha** (08.03.1991), PhD, Yale University, Connecticut, USA.

Dr. Saloni Sinha has contributed towards our understanding of hematopoietic homeostasis. She deciphered the conserved role of *Asrij*, an OCIA domain protein and demonstrated how its absence causes the onset of myeloproliferative disorder due to loss of hematopoietic stem cell quiescence and premature aging.

33. **Dr Hrishikesh A Tavanandi** (06.04.1986), PhD, Department of Food Engineering, CSIR-Central Food Technological Research Institute, Mysore.

Dr. Hrishikesh Tavanandi has developed innovative and translatable hybrid and integrated separation processes to achieve gains in yield and quality of extractable, economically useful phytochemicals from biomass. The noteworthy processes developed by him include, high quality c-phycoerythrin from *Spirulina* and quality drying of micro-organisms by methods alternative to freeze drying. He has designed a variety of equipment for versatile applications in food processing, like those for dosa-making, lemon cutting, puffing and popping, and wet-cum dry grinding.

34. **Dr Ritika Tiwari** (01.07.1988), PhD, Cleveland Clinic, Lerner Research Institute, Cleveland Ohio, USA.

Dr. Ritika's research is towards delineating the molecular mechanism of SPINK1-mediated oncogenesis, and understanding tumour heterogeneity. She has used prostate, and colorectal cancer models to establish the functional relevance of the SPINK1 oncogene and its therapeutic implications in the patients. Importantly she verified that Casein Kinase 1 inhibitor, could be used as an adjuvant therapy to halt the progression of SPINK1-positive neuroendocrine prostate cancer. One of her papers though appeared in pubpeer but has a corrigendum published in *Oncogenesis*.

35. **Dr Vivek Tiwari** (21.03.1986), PhD, Indian Institute of Science, Bengaluru.

For developing state-of-the-art coherent multidimensional spectroscopic techniques and quantum dynamical models to understand ultrafast energy and charge delocalization at the nanoscale.

36. **Dr Sudipta Tung** (14.01.1989), PhD, Ashoka University, Sonapat.

Dr. Sudipta Tung has carried out original and creative work on population stability and evolution of dispersal. Using laboratory populations of *Drosophila melanogaster*, he has uncovered the behavioural, physiological and metabolic correlates of dispersal evolution. He has also investigated the efficacy of various control methods in stabilizing the dynamics of real biological populations. He combines theory and classical assays of experimental evolution with modern physiological and metabolomics techniques, which is a very rare combination in the field.
