



Convocation Special

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Prajwalam

The Newsletter Indian Institute of Technology, Ropar

DIRECTOR'S MESSAGE



Dear Friends,

2019 is coming to an end and it's a time to look back at this eventful year at IIT Ropar. This year we made major breakthroughs in infrastructure creation by shifting the centre of gravity of the institute to our newly built campus. This year also saw a surge in our academic activities with student strength touching 2000. However, the most satisfying feeling for every IIT Ropar stakeholder must have been the high point where the institute was ranked as one of the

top 2 institutes of the country by the **TIMES HIGHER EDUCATION** ranking with a perfect score in research citations. The year also saw monumental challenges such as a devastating flood in the campus and the big push towards completion of the first phase of construction. However, IIT Ropar's Students, Faculty and Staff showed their resilience and commitment to the institute by bouncing back even strongly within record time.

During the last few months, we celebrated a number of important events. The foremost of them being the 550th Birth Anniversary of Guru Nanak Dev Ji and 150th Anniversary of the Father of the Nation. We also celebrated the Annual Cultural Meet, ZEITGEIST 2019 in an enjoyable yet disciplined way. During this period, IIT Ropar got engaged in a number of initiatives in Punjab and Haryana region such as Punjab Innovation and Technology Summit.

IIT Ropar's endeavour for excellence in research connecting it to society and nation's need is also reflected from our growing collaboration with Indian Army and innovation related to problem such as Stubble Burning, Healthcare, Manufacturing, Water Resources etc. With this rich experience of the past, we look forward for an exciting year 2020 to elevate the institute to even greater heights dedicated to the service of the nation.

I take this opportunity to wish all our stakeholders a happy, prosperous and successful New Year.

Jai Hind.

IIT Ropar concludes its VIII Convocation Ceremony



Indian Institute of Technology Ropar held its VIII Convocation Ceremony at its permanent campus. The Chief Guest for the 8th Convocation of IIT Ropar was Shri A. S. Kiran Kumar, Former Chairman, ISRO, who delivered the 8th Convocation address. He has made immense contributions to the design and development of Electro-Optical Imaging Sensors for Airborne, Low Earth Orbit and Geostationary Orbit satellites starting from Bhaskara TV payload to the Mars Orbiter Mission payloads while being Chairman of ISRO. Over 1500 guests comprising students, parents, alumni, faculty and staff members attended the convocation. Prof. Sarit K Das, Director, IIT Ropar shared the achievements of the Institute, students and the awards won under various categories. This year 240 students were awarded their degrees.

Total students awarded degrees: 240

- B.Tech Programme: 113
- M.Sc Programme: 56
- M.Tech Programme: 37
- MS Research Programme: 6
- Ph.D Programme: 28

Suveer Kumar, Department of Mechanical Engineering received President of India Gold Medal amongst the graduating students of B. Tech this year. The Director Gold Medal was awarded to **Aditya Gupta**, Department of Computer Science and Engineering.

Institute Silver medals were given to **Gaurav Kamila**, B.Tech. Department of Electrical Engineering and **Aditya Gupta** of Department of Electrical Engineering. **Debasmita Mukherjee**, M.Tech. in CBME, **Prateek Munjal**, Department of Computer Science and Engineering, **Arshdeep Singh Sandhu**, Department of Electrical Engineering, **Pulak Gupta**, Thermal Engineering, **Rajat Kumar**, M.Sc. in Chemistry Programme, **Sandeep Kumar Mishra**, M.Sc. in Mathematics Programme and **Himanshu Gaur**, M.Sc. in Physics Programme.

Prof. Sarit K Das, Director IIT Ropar addressed the graduates and said, "In the days to come, please do not forget the value of honesty, integrity and truthfulness at every step of your career. There will be temptations for quick temporary gains at the cost of integrity, please have the courage to refuse them. In this 150th year of celebrating Mahatma, do not forget the core value of that great soul, which is "the search for truth". At the same time, please do not forget your commitments to your family, to IIT Ropar and to this Nation."

Addressing the graduating students Shri Kiran Kumar said, "Nature is full of viable ideas for how to do things. All we need is to simply see and listen to the nature, its language, laws and ways to understand it."

"To become an effective lifelong learner you need to adopt a positive and progressive mindset," he added.



QS INDIA RANKINGS



Indian Institute of Technology Ropar once again topped in Research Quality as has been adjudged highest in Citations per Paper among all IITs in India. The success is the result of high-quality

research going on in the institution which focuses on core research areas as well as the interdisciplinary research for solving regional and national problems.

IIT Ropar has been ranked #25 in QS India Rankings 2020. IIT Ropar scored 94.7 in Citation per Paper and 70.2 in Paper per faculty.

This is another feather in the cap of IIT Ropar as this year, the institute made a reputable debut in the international rankings. IIT Ropar has shared the top place in India along with IISc Bangalore with its position in the 301-350 rank in Times Higher Education World University Rankings 2020. Our research score speaks volumes about our considerable progress in Research and Development front during last 3 years. Our research quality and impact can be ascertained from the average citation per paper, which stands at 13.99. This is highest among all the second generation IITs as per recent Scopus data. During the current year, the faculty members and scholars of the institute published 305 papers in high impact international journals with an H-Index of 61.



The number of Ph.D students on campus is increasing every year. This year too has seen a considerable rise in numbers, growing from 389 students last year to 515 this year. The current faculty to Ph.D students ratio is 1:3.17

The second edition of the QS India University Rankings features 107 Indian Universities and the Rankings are based on eight indicators; academic reputation, employer reputation, faculty/student ratio, staff with a Ph.D, papers per faculty, citations per paper, international faculty and international students.

IIT Ropar has brought Stubble Management Solution



Paddy residue burning is a one facet of the crisis in our region. Farmers resort to the annual burning of paddy stubble and straw given the short window available for them to harvest paddy and prepare the field for sowing the successive wheat crop.

IIT Ropar has come up with the novel solution to this problem with a low cost Stubble removing machine. It removes stubble instantly and can be used just after harvesting with a combine. It can be operated with any tractor and cuts and collects stubble. It can be used both for removing rice and wheat stubble. It is very fast and requires only one person to operate. The cost of the system is about 5-6 lakhs. It is powered by tractor and added between tractor and trolley. The header part of straw reaper is used to cut the straws. The revolving reel pushes straws towards auger. The auger sends the straw to the conveyer chamber which takes the straws to the trolley for easy transportation. The collected straws are then taken out of the field and can be used to make manure.

The machine can be mounted on a tractor trolley can chop the stubble up to a few centimeters from the ground and automatically load it into the trolley without any manpower saving labour and cutting down extra spending on diesel, which are the two main concerns being raised by the state farmers.

To address this problem little further, IIT Ropar developed the stubble management system. An active self-sustaining stubble management system is created where each district can have a few of the above machine in a co-operative. For providing services android app and Interactive voice response system (IVR) will be used. The routing and scheduling of machine will be done automatically by the app. The orders can be given either by phone call or through android app. Farmers just need to give details of their field size and location and the app will give day and time to provide service to them.

The machine can be sent to various places to remove stubble as per the request of farmers. The stubble collected can be used to make fertilizer, burn in boiler to generate electricity or create acoustic/Ply boards.

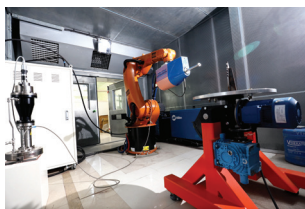
The Project team comprises of Prof. Harpreet Singh (PI), Dr. Prabir Sarkar (PI), Fateh Singh (Project Assistant), Harmanpreet Singh (Project Staff), Moh Sahil (Btech Student), Jaswinder Singh (Lab Assistant), Randhir Singh (Lab Assistant), Girdhari Lal Sharma (Lab Assistant), KV Raju (Lab Assistant), Jaskaran Singh (Lab Assistant). App is developed by two B.Tech students, Ankit and Praful.

CELEBRATION OF 550th BIRTH ANNIVERSARY OF SHRI GURU NANAK DEV JI



IIT Ropar celebrated Gurburab, the 550th birth anniversary of Guru Nanak Dev Ji with religious fervour and gaiety. Attired in colourful dresses, IIT Ropar fraternity, including women and children in the morning took part in Parbhat Pheri and were present in the religious congregations and offered special prayers during Sukhmani Sahib Path. A lecture was scheduled by Professor Brij Pal Singh on ‘Guru Nanak and His Mission’ During the lecture he described Guru Nanak Dev Ji as an apostle of peace and tolerance whose teachings would continue to inspire generations, leading us to the path of righteousness and brotherhood. He said that Guruji strove all his life for promoting social justice and equality and to bring about peace and harmony among the communities.

North India gets its first ‘Cold Spray’ Lab with IIT Ropar-GE collaboration



IIT Ropar successfully established state-of-the-art national facility for Additive Manufacturing in collaboration with General Electric company (GE). The facility, which is now fully operational in the Mechanical Engineering department of the institute, will be using high-pressure Cold-spray technology. This facility has been primarily funded under Uchchatar Avishkar Yojana (UAY) and FIST-DST, Government of India. This cold-spray facility has the capability to provide working pressure of more than 50 bar at 1000oC for repair, refurbishment and component manufacturing for several advanced applications in power generation, aerospace, automobile, bio-medical, textile and processing industries. Cold spray is an eco-friendly and high rate production alternative to its various counterparts in the domains of additive manufacturing and coating technology.

The Institute, in collaboration with GE, will organize a workshop on Cold-spray Applications in February 2020 to popularize this technology among various stakeholders. This project aligns well with the Government of India’s national initiatives such as ‘Make in India’ and ‘Skill India’, promoting the efforts around advanced manufacturing in the country.

MoU signed between IIT Ropar and Indian Army for collaboration in academics and research



Lt. Gen. P. M. Bali, PVSM (Param Vishist Seva Medal), VSM (Vishist Seva Medal) Chief of Staff of Army’s Western Command as a distinguished officer of the Indian Army delivered the first lecture on “China: An Overview, that brought out a broad understanding of China, its psyche & philosophy, strategic interests, dynamics of relations with India, possible triggers of future conflict & their manifestation and implications

for India” at IIT Ropar.

Explaining the contours of China’s Belt & Road Initiative, he marveled on its scale and sophistication, while underscoring the technological, economic and strategic implications. Divulging more he added, “We can foresee with confidence that with the way we are going ahead by associating with institutes such as IIT Ropar, Indian Army will win wars with Indian solutions.”

Highlighting the detrimental effect of India’s dependence on import for military capability, he said, “Military superiority is not determined by numbers alone, armed forces need better technology.” Scientists and engineers have a major role to play not only in indigenizing military capability but developing the strategic influence of the country.

IIT Ropar after his lecture proudly offered the Position of Professor of Practice to Lt. Gen. Bali which he delightfully accepted. An MoU was also signed on this occasion between IIT Ropar and Indian Army for collaboration in academics and research. IIT Ropar will also explore the possibilities of conducting short-term courses and lectures at the Institute by Indian Army.

ZEITGEIST 2019



Zeitgeist, the annual cultural festival of three days organized at IIT Ropar. This year the theme of the annual cultural fest was “The Gothic Poltergeist”, which was based on Halloween. Zeitgeist is a much-celebrated package of art, culture, expression with an overflow of excitement and energy highlights IIT Ropar’s cultural depth and ignites pride in its heritage and legacy with a footfall of 10,000 students.

The Fest included the performances of India’s Best Stand-up Comedian Zakir Khan, graceful Bharatanatyam Performance by Ms. Rama Vaidyanathan, Banaras Gharana of Indian Classical Music Padma Bhushan Pt. Rajan-Sajan Mishra, Sitar Metal, EDM DJ, Torque the war of bands and many more.

It was the final day of the fest, which featured Diljit Dosanjh, and as Diljit moved from one side of the stage to another, dancing to his songs – his moves perfectly in sync with the lyrics – the students followed suit, copying his moves, and even adding their own steps. Enjoying the concert was not enough; the world should know that they are having fun. So many youngsters went live on Instagram, facebook during the concert.

Lashkara was the fashion show where teams from different colleges participate and show their fashion skills and creativity. The action and excitement of this event was unparalleled.

This year Mr. Zeitgeist was Mr. Arshpreet Singh from Rayat and Bahra College and Ms. Zeitgeist was Ms. Pankhuri Saxena from IIT Ropar

PROUD MOMENT: Felicitation of the Director, IIT Ropar by CRIKC Members



Prof. Arun Grover, Former VC, Panjab University, Chandigarh, Prof. Jagat Ram, Director, PGIMER, Chandigarh along with other members of CRIKC institutions felicitated Prof. Sarit K Das, Director, IIT Ropar for the successful debut of IIT Ropar in the World University Rankings 2020.



Dr. Mukesh Kumar

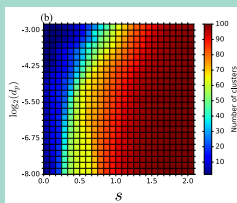
Assistant Professor, Department of Physics has been awarded with the highly competitive Fulbright-Nehru Academic and Professional Excellence Fellowship 2020-2021 by the USIEF.

KNOW YOUR FACULTY



Dr. Partha S. Dutta is an Associate Professor in the Department of Mathematics, Indian Institute of Technology Ropar, Punjab, India. Dr. Dutta joined the institute as an Assistant professor in Feb. 2013. He did his MSc in Applied Mathematics from the Department of Mathematics, University of Burdwan. In 2010, he earned his PhD in Mathematics from IIT Kharagpur for his doctoral research on nonlinear dynamics of non-smooth dynamical systems. During his PhD he was also a DAAD guest researcher at the University of Stuttgart, Germany for a few months. After his PhD he worked as a postdoctoral fellow in the College of Engineering, Mathematics and Physical Sciences at

the University of Exeter, UK in 2010 and pursued research on nonlinear dynamics of light patterns in laser networks funded by EPSRC. Since Feb. 2011 to Jan. 2013 he worked as an Alexander von Humboldt Fellow at ICBM, University of Oldenburg, Germany. During his Humboldt fellowship he developed an interest and expertise in working at the interface of nonlinear dynamics and theoretical biology. At IIT Ropar, Dr. Dutta has established an interdisciplinary research group which focuses on understanding complex dynamics of various natural systems, ranging from computational systems biology to population ecology and climate change. The present research interests of the group are broadly focused on theoretical description and mathematical modeling of natural systems at the interface of theoretical biology and applied mathematics. The group is currently working on complex spatio-temporal dynamics in ecological networks which includes occurrence of chimera, cessation of oscillations, etc. in spatial biological systems. Alongside, the group also focuses on predicting critical transitions in biological systems with special focus on disease dynamics. An early prediction of upcoming critical transitions from a healthy to a diseased state by using early warning signals is of prime interest due to potential applications in forecasting disease onset. Most of the research papers from Dr. Dutta's group are published in journals of international repute. A work on anticipating critical transitions in epithelial-hybrid-mesenchymal cell-fate determination has recently been accepted for publication in PNAS. Their results unravel the early warning signals that can be used to forecast upcoming epithelial-hybrid-mesenchymal transitions that play critical roles in cancer metastasis, drug resistance, and tumor relapse. During his tenure at IIT Ropar, Dr. Dutta has received funding from DST-DAAD under the bilateral exchange programme for two research stays in Germany. In May - Jul. 2017 he was a visiting fellow at the Department of Ecology and Evolutionary Biology, Princeton University, USA. Further information about Dr. Dutta can be found at <http://www.iitrpr.ac.in/mathematics/partha>.



VIGILANCE AWARENESS WEEK



IIT Ropar observed the Vigilance Awareness Week from 28.10.2019 to 02.11.2019. All faculty members and staff were encouraged to observe the Vigilance Awareness Week 2019 with the pledge and on-line pledge. Following events were organized. A special lecture on this occasion was organized on 31st October by Shri Balvinder Singh, Retired Deputy Comptroller & Audit General, presently working as Member (Technical) National Company Law Appellate (NCLAT). He gave a talk on 'Insolvency and Bankruptcy: Impact on corporate Governance.' An Essay writing competition was organized on 01.11.19 in which faculty, staff, and students participated. Winners were given first, second, third, and consolation prizes.

AWARDS AND RECOGNITION

Punjab Government awarded Prof. Harpreet Singh

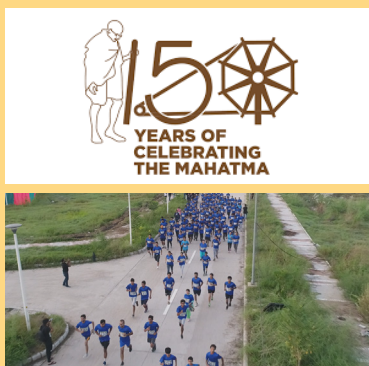


On the occasion of 550th Prakash Purb celebrations of Sri Guru Nanak Dev Ji, the Chief Minister of Punjab Captain Amarinder Singh conferred achievers award to Professor Harpreet Singh, Dean ICSR & II (Industrial Consultancy, Sponsored Research and Industry Interaction) during a ceremony held at Guru Nanak Stadium, Kapurthala, where over 400 eminent Punjabi personalities for their outstanding contribution in various fields were awarded.

Professor Harpreet Singh joined IIT Ropar in 2009 and since then he has contributed a lot and still contributing in giving cutting edge research towards developing several novel coating compositions to prevent high temperature oxidation /corrosion/ erosion-corrosion/ slurry erosion, which can be used as a ready reference by the surface engineering industry.

He is pioneer to publish work on the possibility of using cold spraying process to develop erosion-corrosion resistant coatings for boilers and proposed high temperature corrosion modes for several coatings.

IIT Ropar Organizes Mini Marathon, Commemorating 150 years of Mahatma



IIT Ropar spread the message of Swachh Bharat ..Swastha Bharat" on Gandhi Jayanti by organizing third edition of IIT ROPAR RUN, (mini-marathons of 5 Kms and 11 Kms) to promote health, wellness, and fitness.

Participants started the run from the iconic Main Campus and took the route from inside the city and through the bank of river Satluj walking along the beautiful riverside back to the Main Campus. The cool weather coupled with the sheer beauty of the city during the sunrise at the riverside added glamour to the event.

The IIT fraternity, as well as the residents of the town, participated in this run. This run reaffirmed the recent fit India movement launched by the Prime Minister. Additionally, the run spread the message of cleanliness and no-use of single-use plastics. A total footfall of 1000 plus, including runners as well as the supporters and volunteers participated in the event. Prizes and Medals along with certificates distributed by Prof. S.K Das, Director, IIT Ropar along with Dr. C.C.Reddy, Associate Dean, Student Affairs, Dr. Mukesh Saini, Assistant Professor and Faculty Head, Outdoor Adventure and Social Activities Club.

IIT Ropar and Punjab Infotech Joined Hands

In a bid to extend its services and expertise to the state, and offer mentorship guidance to startups in Punjab, IIT Ropar has signed a Memorandum of Understanding (MoU) with Punjab Infotech in the presence of Sh Rajat Agarwal, IAS, CEO & MD Punjab Infotech, Ms. Ashoonet Kaur, Ex. Directe of Punjab Infotech, Sh Sunil Chawla - DGM Startup Punjab & Mr Hardeep Singh Somal- Sr Consultant Startup Punjab and Mr. J.K.Sharma, CEO, TBI, IIT Ropar. IIT Ropar aims to create a platform where emerging entrepreneurs and startups can engage with key ecosystem players including advisors and government stakeholders. The MoU seeks to offer services to startups such as Pre-incubation support may include idea/product development, business basics, market research, accounting/financial management, pitching ideas, go-to-market strategy, distribution strategy, marketing activities etc.

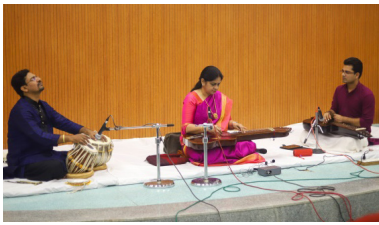


IIT Ropar participated in "Innovation and Technology Summit"



IIT Ropar participated in "Innovation Punjab and Technology Summit organized by Punjab Government on 05.11.2019, which aimed at building a robust ecosystem for

research and innovation by synergizing a strong relationship amongst key sectors such as Government, universities and research institutions, industries, human capital and finance. Prof. Sarit K Das, Director, IIT Ropar was invited as an expert panelist during the session on "Innovation and Academia: Boosting Research & its Commercialization."



Classical Guitar performance by Vidushi Dr. Kamala Shankar



Performance by Padma Bhushan Pt. Rajan and Sajan Mishra

Vidushi Dr. Kamala Shankar a renowned first lady Indian Classical Slide Guitar musician has enthralled the IIT Ropar fraternity through her immaculate and melodious rendition of Hindustani Classical music. The much-revered exponents of the Banaras Gharana of Indian Classical Music Pt. Rajan-Sajan Mishra vowed the students at IIT Ropar with their vocal recitals during Zeitgeist 2019.

MISSION : IIT ROPAR



Metal Spiral Structure

This modern sculpture symbolizes the Mission and Motto of IIT Ropar. In 2017, IIT Ropar adopted its first scientifically formulated Mission statement which indicates three key elements: Contribution to Knowledge, Contribution to the Society and Contribution to the Nation. The three turns of the spiral stand for these three elements. The Institute's Motto is ध्रियो यो नः प्रचोदयात्, which means directing our intellect in the right direction. The tip of the structure pointing towards the zenith represents this.

IIT Ropar organized Hindi Pakhwara



नराकास रुपनगर के सदस्य कार्यालयों के लिए आयोजित हिंदी कविता प्रतियोगिता का क्षण

से आमंत्रित थे। हिंदी पखवाड़ा के दौरान कुल 18 विभिन्न प्रतियोगिताओं का आयोजन किया गया। दिनांक 23.09.2019 को इस पंद्रह दिवसीय कार्यक्रम का समापन हुआ। समापन समारोह में संस्थान के निदेशक प्रो. सरित कुमार दास तथा श्री नागराजन, कुलसचिव, भा.प्रौ.सं.रोपड़ विशेष रुप से उपस्थित थे। प्रतियोगिताओं के विजेताओं को नकद पुरस्कार राशि, स्मृतिचिन्ह और प्रमाणपत्र प्रो. सरित कु. दास और श्री नागराजन जी द्वारा दिये गये।

भारतीय प्रौद्योगिकी संस्थान रोपड़ ने नगर राजभाषा कार्यान्वयन समिति रुपनगर के हिंदी समाह के अंतर्गत भा.प्रौ.सं.रोपड़ में नराकास के सभी सदस्य कार्यालयों के लिए हिंदी कविता प्रतियोगिता का आयोजन किया। जिसमें नराकास के सभी सदस्य कार्यालयों ने बड़-चढ़ कर हिस्सा लिया।

भारतीय प्रौद्योगिकी संस्थान रोपड़ ने नगर राजभाषा कार्यान्वयन समिति रुपनगर के हिंदी समाह के अंतर्गत भा.प्रौ.सं.रोपड़ में नराकास के सभी सदस्य कार्यालयों के लिए हिंदी कविता प्रतियोगिता का आयोजन किया। जिसमें नराकास के सभी सदस्य कार्यालयों ने बड़-चढ़ कर हिस्सा लिया। इस प्रतियोगिता में भारतीय प्रौद्योगिकी संस्थान रोपड़ की सुथी हरप्रीत कौर को तृतीय पुरस्कार प्रदान किया गया।

भारतीय प्रौद्योगिकी संस्थान रोपड़ के हिंदी प्रकोष्ठ द्वारा महात्मा गांधी जी के 150 वीं जयंती के उपलक्ष्य में दिनांक 18.10.2019 को हिंदी व्याख्यानमाला का आयोजन किया गया। हिंदी प्रकोष्ठ द्वारा यह प्रथम व्याख्यानमाला आयोजित की गयी थी। पद्मश्री श्री विनोद दुआ ने मुख्य अतिथि एवं वक्ता के रूप में पधारकर कार्यक्रम की शोभा बढ़ाई। कार्यक्रम का शुभारंभ पद्मश्री श्री विनोद दुआ, भारतीय प्रौद्योगिकी संस्थान रोपड़ के निदेशक प्रो. सरित कुमार दास, डॉ. अरविंद कुमार गुप्ता, संकाय प्रभारी (हिंदी), संस्थान के कुलसचिव श्री बी. नागराजन, संस्थान के संयुक्त कुलसचिव श्री रविंदर कुमार इनके द्वारा दीपप्रज्वलन से हुआ। संस्थान के निदेशक प्रो. सरित कुमार दास इन्होंने शॉल व स्मृतिचिन्ह देकर पद्मश्री श्री विनोद दुआ इनका स्वागत किया। श्री रविंदर कुमार, संयुक्त कुलसचिव ने औपचारिक स्वागत भाषण दिया। इस अवसर पर संस्थान के निदेशक प्रो. सरित कुमार दास तथा कार्यक्रम के मुख्य अतिथि पद्मश्री श्री विनोद दुआ इन्होंने अपने विचार साझा किए। मुख्य अतिथि महोदय के भाषण के पश्चात डॉ. अरविंद कुमार गुप्ता, संकाय प्रभारी (हिंदी) इन्होंने हिंदी व्याख्यानमाला के अंतर्गत संस्थान के विद्यार्थियों तथा संकाय/कर्मचारियों के लिए आयोजित प्रतियोगिताओं के विजेताओं के नामों की घोषणा की। विजेताओं को पद्मश्री श्री विनोद दुआ के द्वारा स्मृतिचिन्ह एवं प्रमाणपत्र प्रदान किए गए। अंत में विद्युत अभियांत्रिकी विभाग के सहायक प्राध्यापक डॉ. सम दर्शी इन्होंने धन्यवाद ज्ञापन किया। इस कार्यक्रम का संचालन भारतीय प्रौद्योगिकी संस्थान रोपड़ के छात्र परिषद के अध्यक्ष श्री यशवर्धन सोलंकी ने किया।

IIT ROPAR RESEARCH IN NEWS

IIT-Ropar gives hope, develops low-cost machine for removing stubble

THE HINDU NEWS SERVICE

ROPAR, NOVEMBER 6
A low-cost stubble-removing machine developed by the Indian Institute of Technology (IIT), Ropar is likely to bring relief to the people of the northern states of the country. The machine, costing around Rs 3 lakh, needs an ordinary tractor to operate and is easy to use and maintain. It can remove stubble from a field within a day, and it can be used in a field of any size. The machine is being developed by the IIT Ropar team, which is led by Prof. J. N. Agrewala. The machine is being developed in response to the demand of farmers for a low-cost machine to remove stubble from their fields. The machine is being developed in response to the demand of farmers for a low-cost machine to remove stubble from their fields.

teley without any major-
ing during labor and cutting
down expenditure on diesel,
which are the two main con-
cerns being raised by the
farmers.
He said farmers wanted
the removal of stubble from
their fields quickly, so that
they could prepare them for
the next crop. Given time
constraints, problems with
storing, infold use and off-
field disposal of the residue,
they have, it is clear the
machine, the farmers would
be able to remove the stub-
ble from at least 10 acres of
their fields within a day.
After removing the stubble
from the fields, it would be
easier to shift to some ob-
stacles it could be used as
fuel or for manufacturing

acoustic boards, which
would further get farmers
some income, he added.
App for small farmers
To make the use of
machine affordable to small
farmers, IITians have also
come up with an idea of
buying them by cooperative
societies. They have devel-
oped an application for reg-
istering the requirement of
machines by farmers.
The testing and adjust-
ing of the machine at co-
operative societies can be
done automatically through
the app. The engines can be
given either by phone call
or through Android app.
Farmers just need to give
the details of their field size
and location and the app
will give the day and time to
provide service to them.



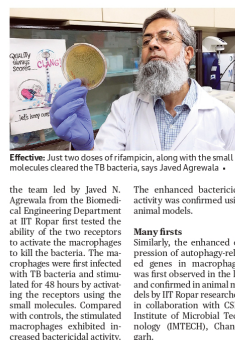
The Tribune
https://tribuneindia.com/article/547323

Stimulating white blood cells helps clear TB bacteria

Potency of TB drugs improved many times when two receptors of the immune cells were activated

R. PRASAD

Instead of using drugs to di-
rectly kill TB bacteria, re-
searchers at the Indian In-
stitute of Technology (IIT)
Ropar have directly stimu-
lated the immune system to
kill the bacteria. This was
achieved by using small mo-
lecules (ligands) to stimulate
two specific receptors
(CLEARE and TLR4) found
on the surface of white blood
cells (macrophages) to kill
the bacteria. The two recep-
tors are copiously expressed
on the surface of the ma-
crophages, and activating them
help regulate the cell func-
tion.
Once activated, the ability
of the macrophages to re-
duce the TB load and elimi-
nate the bacteria gets en-
hanced through increased
autophagy. Autophagy is the
body's way of cleaning out
damaged cells, in order to re-
generate newer, healthier
cells.
Through in vitro studies,



Effective: Just two doses of rifampin, along with the small molecules cleared the TB bacteria, says Javed Agrewala.
The team led by Javed N. Agrewala from the Biomedical Engineering Department at IIT Ropar first tested the ability of the two receptors to activate the macrophages to kill the bacteria. The macrophages were first infected with TB bacteria and stimu-
lated for 48 hours by activating the receptors using the small molecules. Compared with controls, the stimulated macrophages exhibited in-
creased bactericidal activity.

The specificity of the recep-
tors to regulate macrophage
function was tested using
inhibitors which block the
functioning of the receptors.
There was increased survival
of the bacteria in the ma-
crophages on inhibiting the
receptors.
To confirm the role of the
receptors in inducing au-
tophagy, the researchers
abrogated the autophagy in
macrophages and tested the
ability of the activated recep-
tors to clear the bacteria in
mice models. "The ability to
clear the bacteria was absent
when autophagy was inhib-
ited. This helped confirm that
receptor-mediated elimina-
tion of TB bacteria in ma-
crophages was through au-
tophagy," says Prof. Agrewala.
Besides in vitro studies and
mice models, the activated
receptors were found to re-
duce the TB burden when
tested on human macroph-
ages too. The results were
published in the journal
Autophagy.

Compared with controls,
the potency of anti-TB drugs
— isoniazid and rifampin —
to kill the bacteria dramati-
cally improved when the two
receptors were also activa-
ted. With rifampin, the ability
to kill the bacteria was
seen even at one-tenth of the
dose. Greater effectiveness at
reduced dosage was seen on-
ly when rifampin was used
along with anti-TB drugs,"
says Prof. Agrewala. "Since
the receptors only activate
the macrophages and do not
directly act on the bacteria,
there are fewer chances of
emergence of drug-resistant
strains of TB bacteria."

In mouse and Guinea pig
models, there was prolifera-
tion of certain T cells that offer
protection against TB bacteria.
Also, there was significant
increase in the number of memory T cells
that provide long-lasting pro-
tection against TB bacteria
thus signifying protection
from subsequent infection
with TB bacteria.

MARCHING FORWARD AS A TEAM- NEW JOININGS



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