

N MATERIALTM **ADVANTAGE**

The Student Program for Materials Science and Engineering



Material Advantage Student Chapter of Excellence Report 2021-22 Material Advantage @IIT Kanpur Chapter



MATERIAL ADVANTAGE
IIT KANPUR

.....The advantage is beyond materials

Submitted on

May 30, 2022

by

Shruti Dubey

Chair (2021-22)

Material Advantage @IIT Kanpur



April 20, 2022

About Material Advantage @ IIT Kanpur

The Material Advantage Chapter at the Indian Institute of Technology – Kanpur is an initiative of the students of the Department of Materials and Metallurgical Engineering, (now Material Science and Engineering) Indian Institute of Technology - Kanpur.

The members of Material Advantage at IITK, associate us to accomplish the following:

1. Promote Materials Science and Engineering through a joint chapter of ASM, TMS, AIST and ACerS;
2. Provide opportunities for students to become active in the field of Materials Science and Engineering.
3. Provide forums for the exchange of information.
4. Contribute to the learning experience by providing sufficient tools from our research centers and experienced professionals and Encourage professionalism, ethical behavior.

Indian Institute of Technology (IIT) Kanpur became an official charter of Material Advantage on 11th September 2009. Material Advantage @ IIT Kanpur has won the (i) Prestigious “***Chapter of Excellence***” award for the year **2019-2020 and 2020-2021** (ii) “***Most Recruited Students***” during years **2019** and **2020** which includes citation and cash award of US \$1000, (iii) “***Most Creative Recruitment Strategies Award***” during the 2021 and 2011 Fall Membership Challenge, which includes citation and cash award of US \$500, and (iv) “***Most Recruited Students***” challenge for the Fall 2009, which includes citation in one of the AIST/ASM/ACerS/TMS journal and cash award of US \$500.

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Jun 2021-May 2022 MA@IIT Kanpur activity timeline:

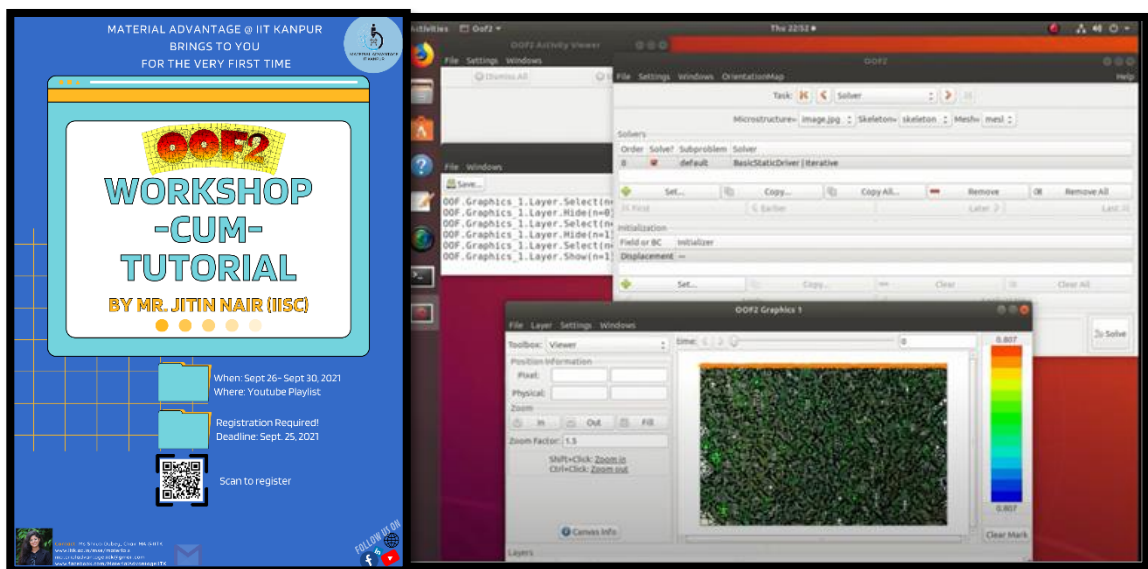
Sl. No.	Date	Events
1	June 1, 2021	Charge handover
2	June 27, 2021	Interaction with Alums- Know your core
3	June 29, 2021	Talk on Importance of Ecosystem restoration
4	July 10-17, 2021	Photography contest: "Revive the Mother Earth"
5	August 6-10,2021	Logo Design contest
6	August 15, 2021	Independence Day Virtual Celebration
7	August 28, 2021	Outreach Event at UIET- MatAd Quiz
8	September 15,2021	Foundation Day-Photo Session
9	September 15,2021	Women in science and engineering-Panel Discussion
10	September 19,2021	Introduction to MA & membership drive
11	September 20,2021	Interactive session on Interview & Communication skills for career success
12	September 22-28, 2021	Two minutes to Pitch- Lightning Talk
13	September 25,2021	Panel discussion on A vision of technological advancement in Material Science & engineering advancing 10 years
14	September 27-28,2021	Workshop on OOF2
15	October 2,2021	Gandhi Jayanti Special Lecture-Urban Mining and Sustainability of Metals
16	October 2-8,2021	Untold story of Resilience- Writing Competition
17	October 4,2021	Outreach Event ACMS Virtual tour
18	October 9-10, 2021	National Webinar on TEM
19	October 11, 2021	Workshop on ThermoCalc
20	October 12, 2021	LaTeX workshop
21	October 15, 2021	Talk on find a leader in you
22	October 19, 2021	Tea Session with MA Members
23	October 19, 2021	e-helpdesk MA membership drive
24	October 20, 2021	Lucky draw and Welcome new members
25	October 27, 2021	MA@IITK Membership drive success party
26	November 1-10, 2021	One-on-one mock interview
27	December 24, 2021	AIST Event- Process Dynamics of basic oxygen steel making
28	December 28, 2021	Interactive session with Shri Pradeep Goyal: ASM Distinguished Life Member and Fellow
29	December 30,2021	Interaction with Alums: Life at IITK and beyond
30	January 26, 2022	Republic day and Understanding lecture on "15 vs. 21 vs. 45: A journey into the world of anisotropic elastic properties"
31	January 31, 2022	Talk on "Patent First Publish later"
32	February 26, 2022	Frontier lecture: "Multi- Material printing"
33	March 15, 2022	Bicycling for nature conservation
34	April 19,2022	Workshop on Origin

The plethora of events organized by the Chapter during the academic year 2021-2022 can be divided into broad categories as:

1. Programming

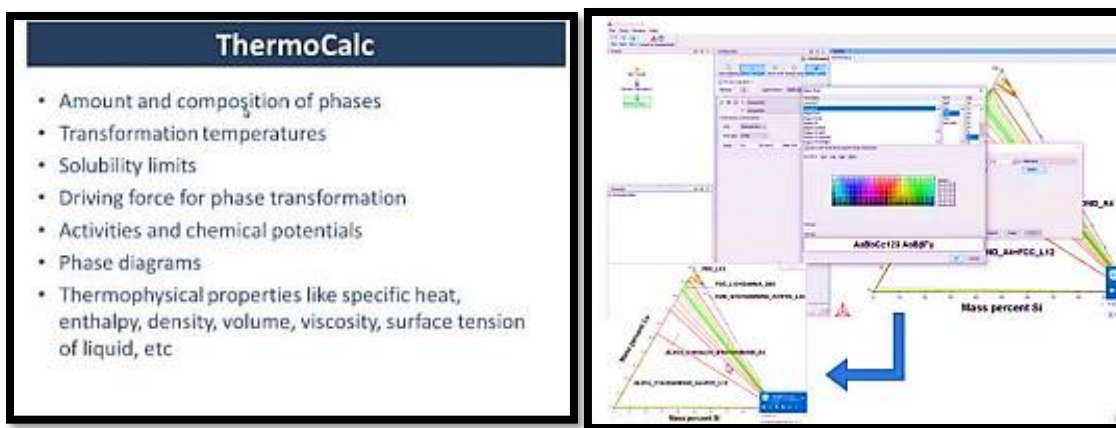
1. Workshop on OOF2 Speaker: Mr. Jitin Nair (Sept. 22-28, 2021)

MA@ IIT Kanpur held an online session on the fundamentals of OOF2 as part of a student drive from September 22 to September 28. Object oriented finite elements is abbreviated as OOF2. This is a free software programme developed by NIST that studies microstructure and operates on a Linux operating system. The microstructure is a complex ensemble of grains, phases, pores, fissures, and other micrometer-scale characteristics. Mr. Jitin Nair, the speaker, released pre-recorded recordings for the event, which were made available to registered participants via YouTube. A series of movies demonstrating the importance of the OOF2 tool, software installation, key terminologies, and sample examples were included in the playlist. Mechanical deformation of the material with input of the material properties of the microstructural features in the micrograph were used as examples. More than 60 people from IITK's various departments attended the event.



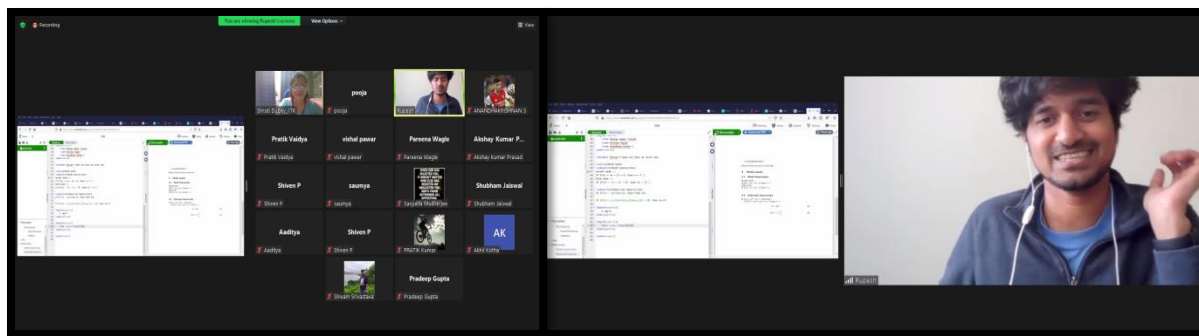
2. Workshop on Thermo-calc, Speaker Dr. Reshma Sonkusare (Oct. 11, 2021)

Thermo-Calc is a prominent software tool used widely in materials science. The CALFAD based software is used for wide range thermodynamic and property calculations. Material Advantage @IITK, organized a virtual workshop on Thermo-Calc software on October 11, 2021, by Dr. Reshma Sonkusare (Post-doctoral fellow, Karlsruhe Institute of Technology, Germany). The speaker structured the talk consisting of a basic introduction on working computational software followed by real time examples by plotting binary and ternary phase diagrams and diffusional studies. The event drew a lot of student participation not only, from the material science departments but also, from other departments of IITK.



3. Workshop on LaTeX, Speaker: Dr. Rupesh Chafle (Oct. 12, 2021)

During the fall membership challenge drive, Material Advantage @ IIT Kanpur organized a workshop on LaTeX document writing on Oct. 12, 2021, by Dr. Rupesh Chafle (currently a postdoctoral fellow in Helmholtz Zentrum Hereon, Germany). LaTeX has a prominent role in the preparation and publication of books and articles that contain complex multilingual materials. Both undergraduate as well as postgraduate students attended this workshop.



4. Workshop on Origin by Dr. Rubia Hassan (Apr. 19, 2022)

Origin is a prominent role in data analysis and scientific graphing most used by the scientific researchers. This tool has makes it simple to create and customize good quality for publication. Video lecture cum interactive session on ORIGIN software on 19 Apr. 2022 by Dr. Rubia Hassan (Research scholar in MSE department). Speaker started with the basic introduction about the Origin and scientific data graphing. As the part event some of the most common plots such as histogram, cumulative distribution etc.

Material Advantage @IITK brings

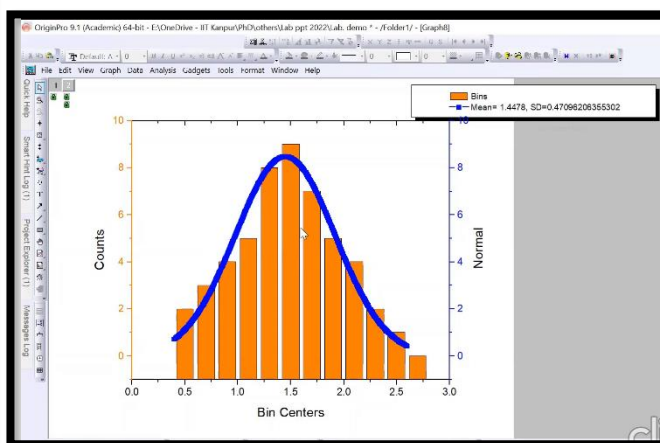
Video Lecture-Cum-Interactive Session on

ORIGIN SOFTWARE

Registration Deadline
14.04.2022

Speaker
Ms. Rubia Hassan
PhD (MSE IITK)

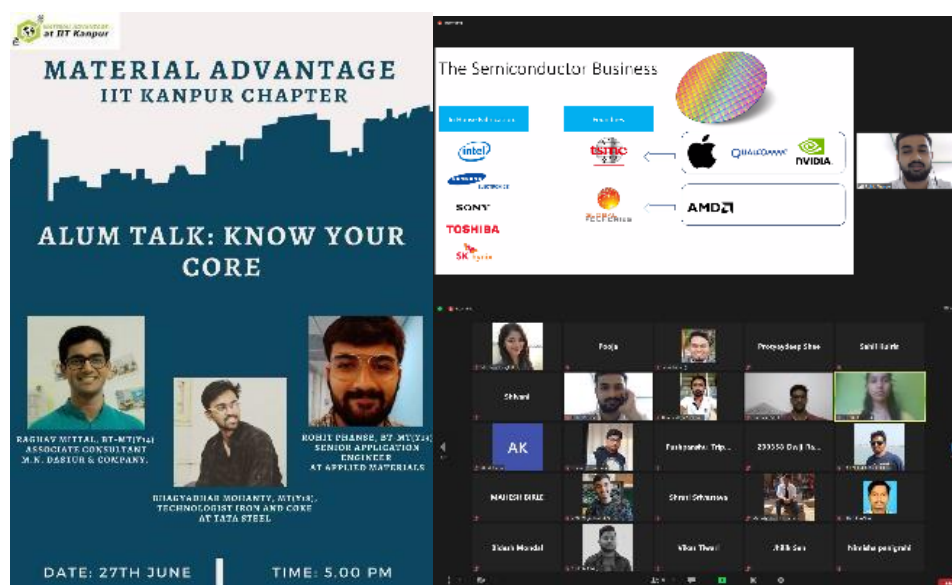
Contact: Ms Shrushti Dubey, Chair MA @IITK
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www.facebook.com/MaterialAdvantageIITK



2. Career Development

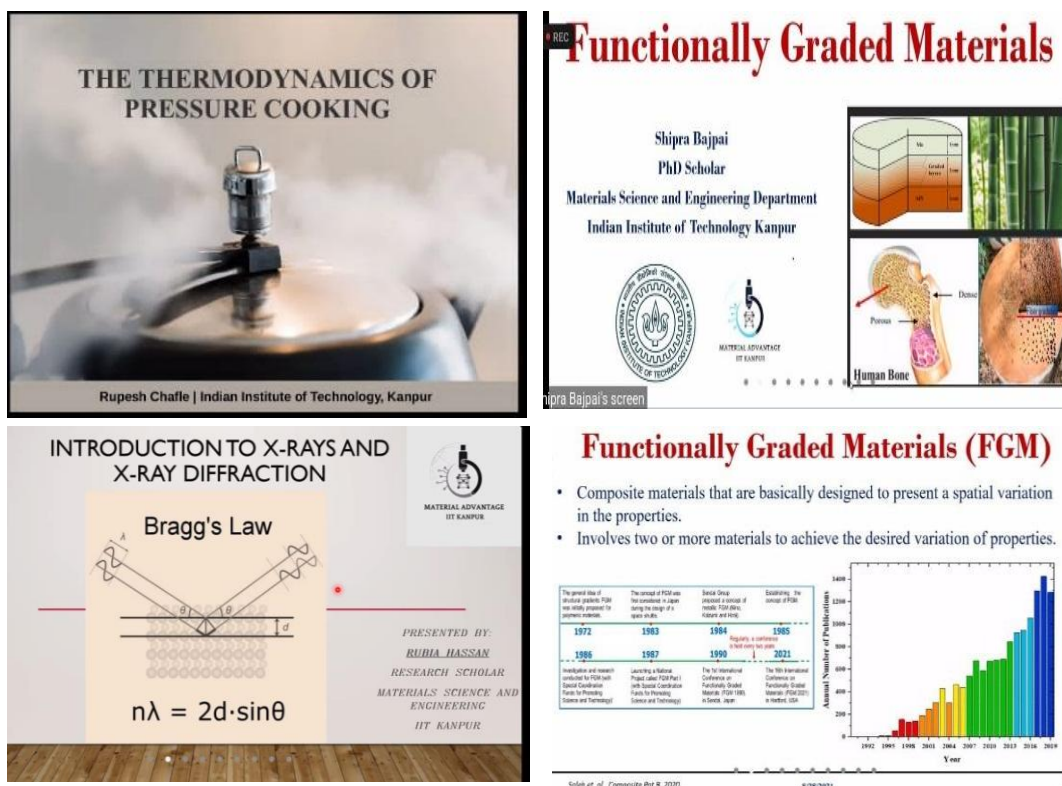
1. Interact with Alums- Know your core (Jun. 27, 2021)

MA @ IITK held an interactive session with Mr. Rohit, Mr. Raghav and Mr. Bhagyadhar who are the alumni of the MSE department at IITK and presently working in the core sectors. During the session, the alumni shared their knowledge and experiences, both academic as well as industrial. They also interacted with the audience, answered all their queries in detail and provided key insights that would be beneficial for anyone starting their career.



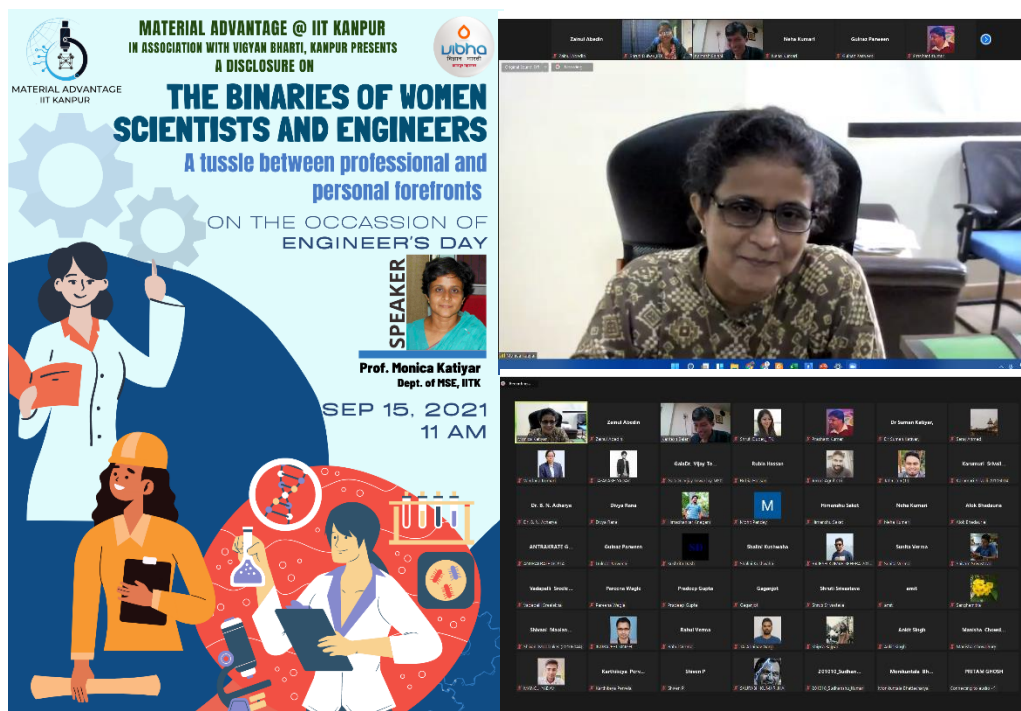
2. Outreach Event – Short talks & MaTAd Quiz (Aug. 28, 2021)

MA @ IIT Kanpur conducted an interactive panel discussion and quiz for the MSME students of Chatrapati Sahu Ji Maharaj University Kanpur on August 28, 2021. The discussion topics were “The Thermodynamics of pressure cooking” by Mr. Rupesh Chafle (PhD, MSE-IITK), “Functionally graded materials” by Ms. Shipra Bajpai (PhD, MSE-IITK), and “Introduction to X-Rays and X-Ray Diffraction” by Ms. Rubia Hassan (PhD, MSE-IITK). The interactive session has ended with a online multiple choice quiz on the discussion session. The winners were provided with discounted memberships for becoming members of the Material Advantage along with certificates of merit.



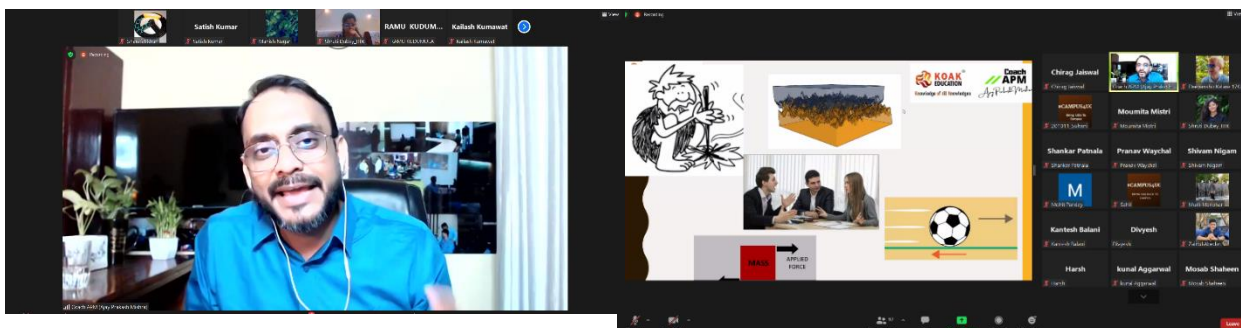
3. Engineer's Day discourse with Prof. Monica Katiyar (Sept. 15, 2021)

MA@IITK has celebrated this year's Engineers Day on the theme "The Binaries of Women Scientists and Engineers: A Tussle Between Professional and Personal Forefronts" in collaboration with "Vibha Vigyan Bharti." The speaker of the event was Professor Mounika Katiyar from the MSE Dept. of IIT Kanpur. This interactive session had questions asked by the students, and the speaker has shared her views and success journey. Also, she highlighted the transition of women's participation in STEM research and encouraged budding engineers to take more challenges. She concluded, stating that men and women must work synergistically for our tomorrow. Professor Kantesh Balani moderated the event. Over 57+ participants from various departments of IIT Kanpur and Vibha Vigyan Bharti joined the session.



4. Interview Skills and Communication Skills for Career Success (Sept. 21, 2021), Speaker: Mr. Ajay Prakash Mishra

On September 21, Material advantage organized a workshop on Interview and Communication skills. We had an energetic speaker *Ajay Prakash Mishra who works at KOAK education and is commonly known as ‘COACH APM.’* The session started with a presentation that followed the Q& A of the students. The speaker mentored students on acing the interviews and improving one's communication skills. They were simplified that the most critical aspects of human life are confidence, communications skills, and clarity. As the event progressed, the interaction between the students and the speaker increased. He also shared the suggestions to tackle in an interview by presenting one in the best way and tips necessary to improve overall performance. The event drew a lot of student participation not only from the material science departments but also from other departments of IITK. The event lasted for 2 hours, with more than 100 attendees.



5. Two-minute to Pitch-Lightning Talk National Competition (Sept. 22 to 28 2021)

From September 22 to 28, 2021, Material Advantage At IIT Kanpur hosted a national event called "Two-Minute to Pitch-Lightning Talk" in collaboration with ASM International India branch. The presentation's theme was "Material Charkha," which was a reference to the forthcoming Gandhi Jayanti. Structure, processing, performance, and characteristics were all considered when judging the entries. Freshmen and graduates were given different grades. This nationwide event attracted participants from various institutes across India, who offered their ideas by sending pre-recorded 2-minute presentation videos. Dr. U. Kamachi Mudali announced the winners of the events on Gandhi Jayanti, October 2nd. Mr. Ashok Allamula (Research Scholar, IIT Madras, India) won the PG category, with Mr. Adarsha Ranjan Mishra coming in second (M.Tech, IIT Kharagpur, India).

ASM INTERNATIONAL INDIA CHAPTER
MATERIAL ADVANTAGE @IITK IN ASSOCIATION WITH
ASM INTERNATIONAL, INDIA CHAPTER
ON THE EVE OF
GANDHI JAYANTI BRINGS

TWO MINUTES TO PITCH- LIGHTNING TALK

Structure Processing
Micro/Nano Macro Meso
Properties Performance

ENTRIES ACCEPTED FROM 22ND TO 28TH SEPTEMBER

Material Advantage brings to you the unique opportunity to showcase your presentation skills on various fields from 'Materials Charkha'

Winner from each category will be announced on 2nd October

EXPLAIN IN 2 MINUTES ABOUT ANY RESEARCH TOPIC USING THE MATERIALS CHARKHA AS SHOWN ABOVE.

CATEGORIES
• BEGINNER LEVEL - UG
• ADVANCED LEVEL - PG

Scan to participate or click
<https://forms.gle/XGfpwRhaGBNNmyT8>

Contact: Ms. Shrutti Dubey, Chair MA @IITK
www.iitk.ac.in/mse/materials
materialadvantage.iitkg@gmail.com
www.facebook.com/MaterialAdvantageIITK

IF YOU CAN EXPLAIN IT SIMPLY,
YOU UNDERSTAND IT WELL!
-EINSTEIN

FOLLOW US ON

6. Panel Discussion on Technological Advancement in Materials Science on (Sept. 25, 2021) Speakers: Prof. Niraj Chawake, Prof. Nilesh Gurao and Prof. Shikhar Jha Moderator: Prof Kantesh Balani

This event was conducted to discuss the future technological advancement in Material Science & Engineering. Students got the opportunity to ask their questions to professors who are working in different fields of materials science to get in depth of their field and make future decisions. Questions regarding job opportunities in this field in the future, scope of PhD and MTech, also new quality of materials which we are going to witness in future were addressed. Panelists also discussed how technological advancement in Materials Science is going to bring changes in our daily life. The event was moderated by *Prof. Kantesh Balani*, Faculty Advisor MA@IITK with *Prof. Niraj Chawake*, *Prof. Nilesh Gurao* and *Prof. Shikhar Jha* as the panelists.

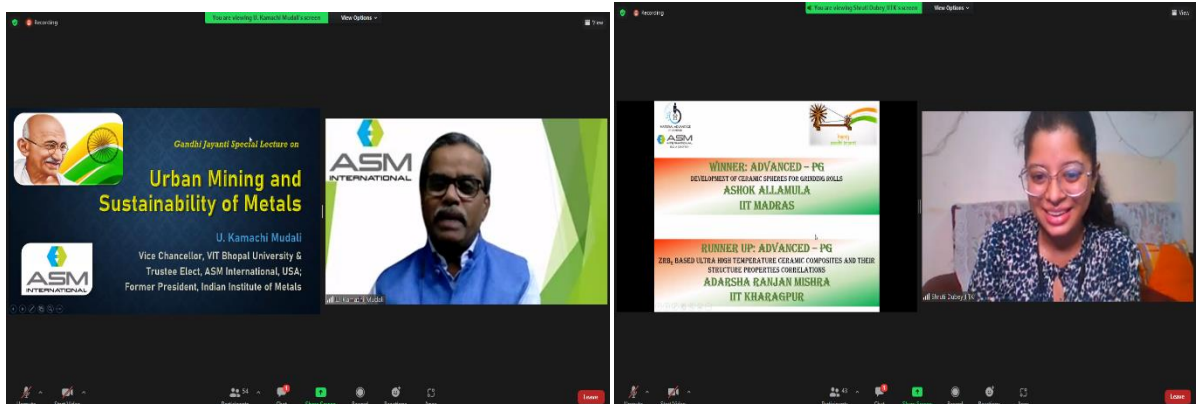


7. Gandhi Jayanti guest lecture on Urban Mining and Sustainability of Metals, (Oct. 2, 2021)

Speaker: Dr. U. Kamachi Mudali

On 2nd October 2021, **Dr. U. Kamachi Mudali**, Vice-Chancellor of VIT Bhopal University, ASM Board of Trustee and formerly Distinguished Scientist, Chief Executive, and Chairman of Heavy Water Board, Mumbai delivered a special Lecture on “Urban Mining and Sustainability of metals” on the occasion of Gandhi Jayanti. The event was hosted by Ms. Shruti Dubey, Chair, MA@IITK. The event started with a Patriotic song by Miss Akhila Mudupu and Poetry by the students of the MSE Department, IIT Kanpur, and Prof. Kantesh Balani, Faculty Advisor, MA@IITK introduced the Speaker. He talked about materials related to human civilization and the global scenario of different metal productions and how India can grow further in these aspects. The lecture was very informative with facts and figures to enlighten the participants. He gave several ideas and showed examples of how we can follow the 3 R’s principle Reduce, Reuse and Recycle. He also highlighted the facts about the low production cost of various metals such as steel, copper, nickel, gold, silver, aluminum, and rare-earth elements by using the 3 R’s principle and He conclude the event with a very nice quote “We do not inherit the Earth from our ancestors; We borrow it from our Children”. In the end, the result was declared for the “Two Minutes to Pitch-Lightning Talk” which was organized by MA@IITK in association with ASM International, India Chapter from 22nd to 28th September.

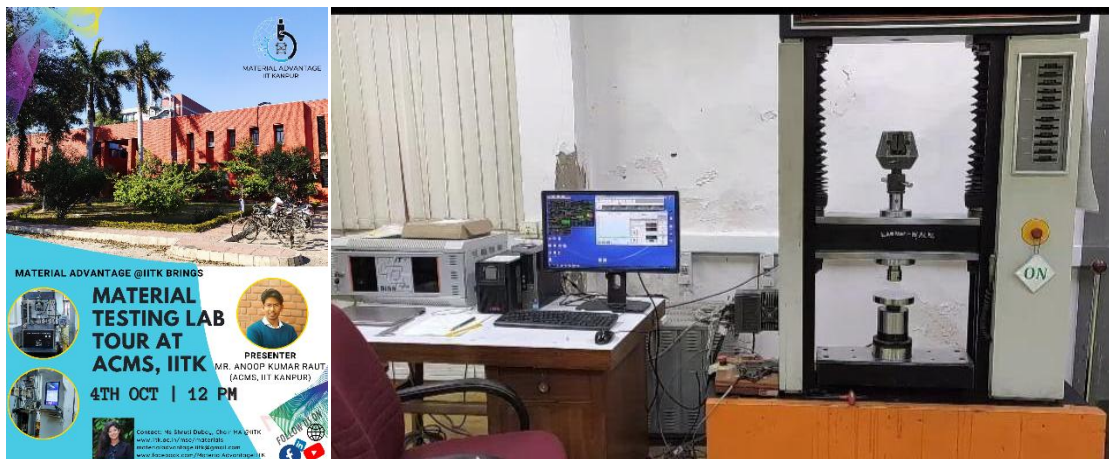
Over 60+ participants from various departments and programs from different engineering colleges of India have joined the session along with some board members of the ASM, India chapter.



8. Virtual tour of Mechanical Testing Laboratory ACMS IIT KANPUR on (Oct. 04, 2021)

Speaker: Mr. Anoop Raut

On 4th October, Material Advantage IIT Kanpur chapter organized an outreach event in collaboration with Advanced center for Material sciences (ACMS) IIT Kanpur. The speaker **Mr. Anoop Raut** is currently Technical Superintendent in ACMS IIT Kanpur. Session was a virtual demonstration of various Mechanical tests that are performed in the Mechanical Testing laboratory. The virtual demonstration consisted of tension/compression, shear, fatigue, creep, and Charpy impact tests on different materials and sizes. The session covered how/why material will fail and connected to different examples like in failure of ships in World War II caused by low notch toughness at low temperature is steel at welded joints. Explained with study of sample with software and control panel. In this over 100+ participants from various departments and programs from different engineering colleges are associated with India.



Speakers: Prof. Niraj Chawake and Dr. Bhagyaraj

The second session of the two days event was on common sample preparation techniques used for transmission electron microscopy. The event's speaker was ***Dr. Bhagyaraj***, who works in Research and Development with Tata Steel and possesses 5+ years of experience with TEM. The presentation started with powder sample preparation, followed by bulk samples, i.e., metals, ceramics, and polymers. Speaker shared his knowledge and gave tips to overcome the common mistakes during preparation and rectify them. Participants were mainly from MSE and had the same number of participants as day one. The event was interactive, with the speaker giving practical solutions.




Material Advantage @ IIT Kanpur
brings
**TRANSMISSION
ELECTRON MICROSCOPY
WORKSHOP**

- Basics and construction of TEM
- Image acquisition BF, DF and SADP
- Analysis of SADP, a general methodology for different crystal systems
- Basics of STEM, ABF, ADF and HAADF
- Introduction of dislocation analysis and example



DAY 1



PROF. N. CHAWAKE
MSE, IIT KANPUR

DAY 2



**DR. BHAGYRAJ
TATA** STEEL, R&D

FOLLOW US ON



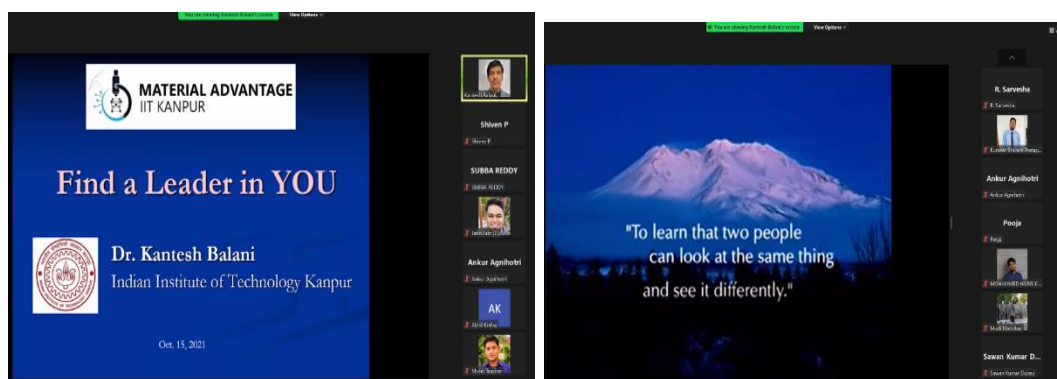
Search nearby (Google)

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www.facebook.com/MaterialAdvantageIITK

10. Interactive session-cum-talk on “Find a Leader in you” (Oct. 15, 2021)

Speaker: Dr. Kantesh Balani

An inspirational and interactive session was organized by material advantage IIT Kanpur on the title “Find a leader in you.” **Dr. Kantesh Balani** shared thoughts for the day, a professor in the Department of Materials Science and Engineering at IIT Kanpur. The talk highlighted the qualities one should possess or inculcate to become a leader. Leadership starts with living in a state of possibility and healthy regard to the impossibility. The speaker drew examples from prominent leaders such as Martin Luther King and Mahatma Gandhi, decoding the traits of a leader. Also, an interactive event was held with four volunteers to demonstrate that “To learn that two people are looking at something and see things differently.” More than 40 + participants have attended this life hacks session, and this session ended with answers to queries.



11. One-on-one mock interview (Nov. 1-10, 2021)

One-on-one mock interview, one of the most anticipated events of the Material Advantage IITK chapter, was held between November 1 and 10, where alumni of our institute conducted mock interviews of current undergraduate and post-graduate students seeking jobs. The technical and HR interviews of 11 interested students were conducted by Dr. Prabhat Rai (JSW Steel), Miss Monali Monalisa (Applied Materials), and Mr. Ankur Bhattacharjee (IIM Bangalore).



12.AIST Event- Process Dynamics of basic oxygen steel making (Dec. 24, 2021)

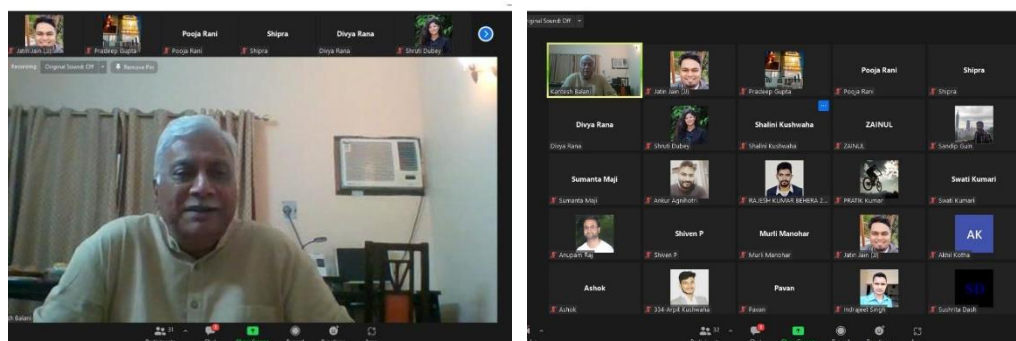
Speaker: Dr. Rahul Sarkar

The Association of Iron and Steel Technology (AIST) is a non-profit organization performing in the advancement of technical development, production, processing, and application of iron and steel. AIST is a global leader in networking with 15500 members and works on education and sustainability programs for iron and steel advancement. MA@ IIT Kanpur Chapter conducted an AIST event to enlighten the student community with AIST steel to student training programs, Young Professional and Student Mentorship Program, Student resume coaching, and other AIST resources. AISTech 2022 conference, related registration process, and discount details were elaborated to the student community. The event had also facilitated through a lecture session on the Basic Oxygen Steelmaking (BOS) process by the speaker Dr. Rahul Sarkar, Assistant Professor, M.S.E Department, IIT Kanpur. BOS Steelmaking concepts are addressed to students in the most simple and easy way. The event ended with a souvenir presented to Dr. Rahul Sarkar by the MA's faculty adviser Prof. K Balani.



13. Interactive session with Shri Pradeep Goyal: ASM Distinguished Life Member and Fellow (Dec. 28, 2021)

Mr. Pradeep Goyal is an engineer, alumnus of Indian Institute of Technology, Kanpur (1978) in Metallurgy and obtained his M.S from the world-renowned Massachusetts Institute of Technology, Cambridge, MA, USA, (1980). MA@IITK organized an interaction session with Pradeep Goyal and lasted for an hour. The interactive session was on the experiences of his life at IIT Kanpur, pursuit of carrier in metallurgy and as in entrepreneur.



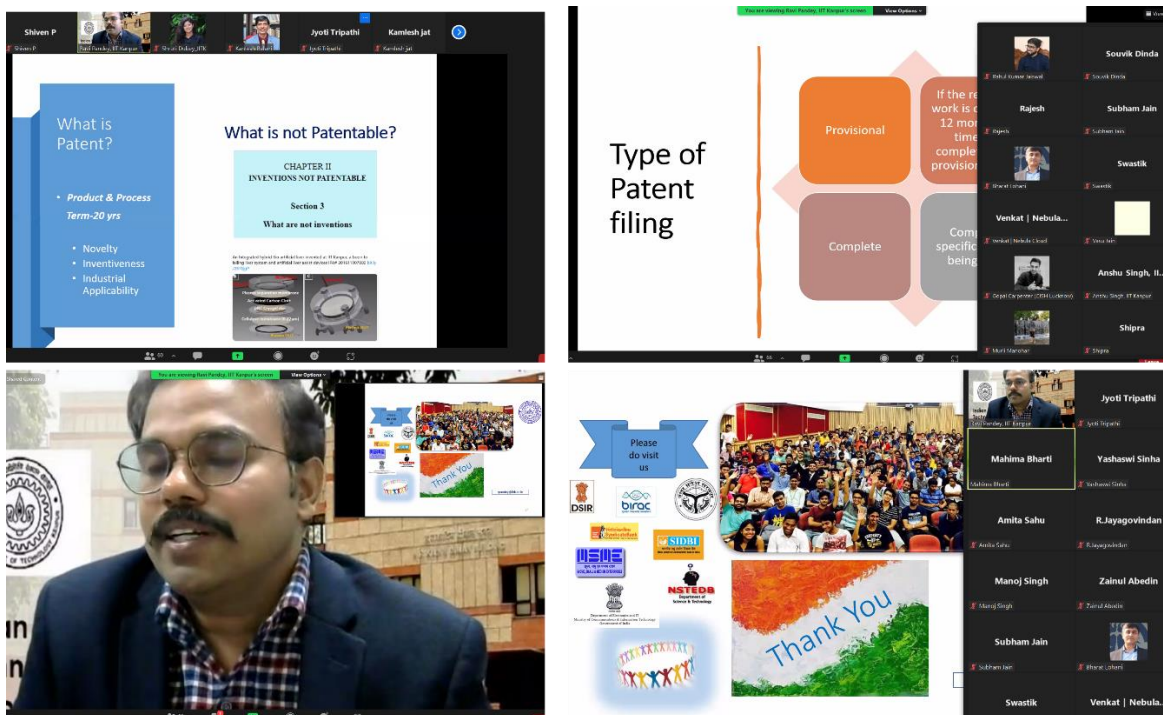
14. Understanding lecture on "15 vs. 21 vs. 45: A journey into the world of anisotropic elastic properties". (Jan. 26, 2022)

MA@IITK has celebrated India's 73rd Republic Day on 26 January 2022 virtually with gaiety, and fervor. The event started with the virtual hoisting of our Tricolor flag by Prof. Rajesh Prasad (IIT D) and later with a patriotic song sung by Miss Akhila Mudupu (M. Tech, I year MSE). This event is part of our "Understanding Lecture series" of the Material Advantage IITK chapter and this has collaborated with the ASM International India chapter. The talk was titled "15 vs. 21 vs. 45: A journey into the world of anisotropic elastic properties" by Prof. Rajesh Prasad, Dept. Material Science and Engineering, IIT Delhi. The speaker was introduced by Prof Kantesh Balani (IIT Kanpur, Dept. of MSE). Speaker takes us through a journey dating from the 1700s where the concept of elasticity was mathematically presented by Robert Hooke widely known as Hooke's law. Cauchy later introduced the concept of stress and strain relationship by elastic modulus. Elastic modulus is a second-order tensor with 81 elastic constants with the symmetry of the crystal the no of constants required reduces to describe the anisotropic elastic properties. He also shared the inspiring story of Green's how he derived anisotropic elastic constants. The current event drew 140+ participants from all over India from various departments and colleges. The events ended with clarifying the doubts of participants and vote of thanks with a souvenir by Shruti Dubey (Chair of MA).

The screenshot shows a virtual event interface. On the left, a banner reads "WELCOME TO VIRTUAL CELEBRATION OF REPUBLIC DAY" with logos for Material Advantage (IITK) and ASM International India. Below the banner is a video player showing "vande mataram" with the text "celebrating the true spirit of India" and "a song by a.r.rahman, a film by bala & kanika". At the bottom, it says "73 YEARS OF REPUBLIC INDIA". On the right, a slide titled "From force to stress and from elongation to strain" shows a flowchart: Force $F = k\Delta L$ Displacement leads to Stress $\sigma = \frac{F}{A_0}$ and Strain $\epsilon = \frac{\Delta L}{L_0}$, which are related by Modulus (Material) E and Young's Modulus E . The slide also mentions "1678 Hooke" and "1822 Cauchy". At the bottom of the slide, it says "A great Engineering achievement".

15. Talk on "Patent First Publish later" by Mr. Ravi Pandey (REO, IP & Tech Transfer, SIIC, IIT Kanpur) (Jan. 31, 2022)

Material Advantage IIT Kanpur Chapter conducted a PATENT FIRST PUBLISH LATER. The speaker Mr. Ravi Pandey (REO, IP & Tech Transfer, SIIC, IITK) enlightened the student community with Intellectual property rights, patents application procedure and needs for patenting before publications. Also, shared about the support of IIT Kanpur in patenting. The event had observed the participation of more than 100 students and faculty members of the Department of Materials Science and Engineering, IIT Kanpur. The event had also facilitated through a Q&A session helping to address student's queries in the simplest way.



16. Frontier lecture: "Multi-Material printing" by Prof. J. Ram Kumar, IIT Kanpur (Feb. 26, 2022)

MA@IITK organizes a Frontier Lectures series every year. The first talk of the lecture series in the session titled “Multi Material Printing” in February. 26, 2022 (Evening Session). Prof. J. Ram Kumar, Department of Mechanical Engineering, IIT Kanpur, presented a lecture and describing various aspects of the Multi material additive manufacturing such as its Rapid prototyping & 3D printing, various AM Technologies, and its industrial applications, some elegant and powerful ideas have addressed many of these limitations. The speaker explained each of the selected topics with various examples such as Various applications of AM in the medical field, biomed Industrial applications, model of bridges and challenges etc. More than 39 students from IITK joined the session. The events ended with clarifying all doubts of participants and vote of thanks with a souvenir by Shruti Dubey (Chair of MA).

The screenshot displays a Zoom meeting interface. On the left, three slides from a presentation are visible:

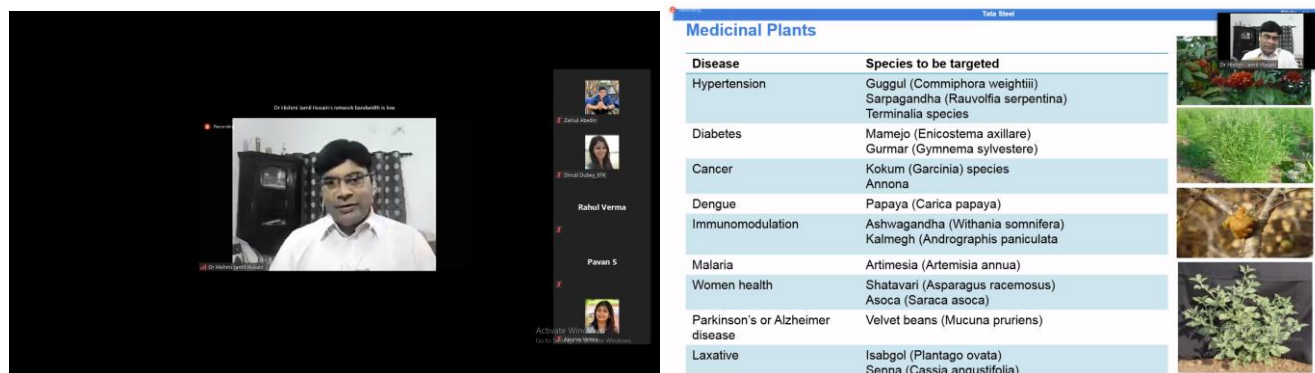
- Slide 1: AM, RP & and RM** - A hierarchical diagram showing the relationship between Additive Manufacturing (AM), Rapid Prototyping (RP), and Rapid Manufacturing (RM). AM is at the top, branching into RP and RM. RP further branches into Solid Imaging, Functional Prototyping, and Direct Imaging. RM branches into Direct Imaging and Direct Manufacturing.
- Slide 2: Various AM Technologies** - A circular diagram with 'Additive Manufacturing Technologies' at the center. Surrounding it are various technologies: Powder Bed Fusion (PBF), Direct Ink Writing (DIW), Material Jetting, Binder Jetting, and Vat Photopolymerization. Each technology is associated with specific materials and applications.
- Slide 3: Processes employed** - A list of processes used in AM: Powder bed fusion, material extrusion, and VAT photopolymerization. It also mentions that material jetting is not used for implants and biomanufacturing, and binder jetting is not utilized for tools, instruments, and parts for medical devices. The most common materials are thermoplastics, photopolymers, and metals such as titanium alloys. AM has significant potential in personalized and customized solutions.

On the right side of the Zoom interface, a 'Participants (39)' list is shown, including names like Ankur Agnihotri, Shruti Dubey_IITK (Host), Janakarajan Ramkumar, Vikas Tiwari, ADITYA SARKAR, Akhil Kotha, Akhila Mudupu, AMAN NIGAM, Amrita Sahu, Amrita Dixit, anshul Sharma, and Anurag Jha.

3. Service

1. Talk on Importance of Ecosystem restoration (Jun. 29, 2021)

On 29th June 2021, Dr. Hishmi Jamil Husain, Head Biodiversity, Corporate Sustainability at Tata Steel delivered a talk on Ecosystem Restoration. He gave several ideas and showed examples of how to restore our ecosystem by 3R (Reimagine, Recreate and Restore). He talked about various species of plants which are important and getting extinct. He also highlighted the facts about urbanization and how Agenda 2030 dealing with sustainable development goals could affect our ecosystem. Later, he discussed India's 12 National Biodiversity targets and explained its national policy and macrolevel action strategy. He listed several indoor common air pollutants sources and the disease it causes and listed a range of medicinal plants to curb its harmful effects. As a corporate leader, he showed how to reclaim the mined land and convert it to a beautiful biodiversity park. Over 40+ participants from various departments and programmes joined the session and interacted with the speaker raising various environmental concerns.



2. Photography contest: "Revive the Mother Earth" (Jul. 10-17, 2021)

MA@IITK organized a photography contest from 10th to 17th July where participants shared their moments of contribution to nature. This event is a furtherance of the talk organized on "Importance of Ecosystem Restoration " by Dr. Hishmi Jamil Husain, (on 29th June 2021, *Head Biodiversity, Corporate Sustainability, Tata Steel*). The current

event was divided into two portions, from 10th–13th July entries were taken and from 14th-17th July social media promotion through Facebook was done. The community enthusiastically participated in the event with more than 30 entries for the contest. . Finally, on 18th July 2021, the winners from each category were declared. One is based on likes and comments on their posts and the other is based on lucky draws. Mr. Saurabh Jha won the event with maximum likes and comments on his post and the lucky draw was won by Mr. Sachin Kumar Tarnalli. The event received appreciation from the IITK community and sought more such events in the future.



3. Logo Design contest (Aug. 6-10, 2021)

MA@IITK organized the “Logo Design competition” from 6 August to 11 August. For the first time since interception of material advantage IIT Kanpur student chapter, planned to revamp our logo. The new logo is redesigned retaining three major elements: the globe, unit cell, and microscope. This event drew 10+ participants comprising students and faculties of the institution. The winners of the event are declared on Independence Day. Participants played with their design and creative skills making this event successful. The winner of the event won a Rs 1000 cash prize.



4. Tell your Untold stories of resilience-Writing Competition (Oct. 04-08, 2021)

As part of the Fall Membership drive, Material Advantage at IIT Kanpur conducted an event named “Tell your untold stories of Resilience” from Oct. 04-08, 2021. Many students participated and shared their stories of resilience, motivation and inspiration and how they developed many creative ideas to face challenging times. All the stories posted on the official Facebook group of MA@IITK Chapter. The winner announcement is done based on the maximum number of likes, comments, and shares on the Facebook page. Membership discount and prize was given to the Winner.

Material Advantage @IIT Kanpur chapter brings a platform to

Tell your untold stories of resilience

Share your experiences to spread the positivity

Description

Everybody faces many problems in their life and fights through it. Many incidents in life change us and make us better. So if you have any such experience which has brought the better version of you and you that it can inspire others then this event is for you. In this event, you can share your such experience that has brought the resilience in you and spread the positivity energy among others.

Rules and Guidelines

1. An individual can submit only one entry in each category.
2. Participants should share their own experience
3. The story will be shared on the Facebook page of MA if wanted their name can also be mentioned otherwise identity would be kept reserved.

Selection

- 50% judgment based on social media publicity and 50% by judges
- Organizers have the right to reject any inappropriate entry.
- Prizes and Material advantage membership discount for the winner

OCTOBER 4 TO 8 ,2021

Submit your enties on
materialadvantage.iitk@gmail.com

*Follow on our Facebook page
Entries will be posted on our Facebook page
Tag #fallmembershitchallengesdrive2021 #MA@iitk
Share with your friends
The entry with maximum like wins

Contact: Ms Shruti Dubey, Chair MA @IITK
www.iitk.ac.in/ma/materials
materialadvantage.iitk@gmail.com
www.facebook.com/MaterialAdvantageIITK

FOLLOW US ON

5. Bicycling for Nature Conservation (Mar. 27, 2022)

On 27th March 2022, Material Advantage @ IITK conducted an event on the theme “Bicycle is a catalyst for Natures Conservation”. In this event the Material Advantage team of IIT Kanpur participated in the exciting 40 Km Bicycling ride from IIT Kanpur to Bithoor Ghat. Bicycle can also be thought as a tool for nature conservation. Cycling improves physical and mental health. The moto of this event was to create awareness among people about Environmental pollution control and Healthy Lifestyle. The participants had a lot of fun in this event and witnessed the beauty of nature during the journey.



4. Social Activities

1. Virtual Celebration of National Events- SwAM (National Days)

The celebration of National events was successfully conducted virtually. Republic Day (26th Jan 2021), Independence Day (15th Aug 2021) and Gandhi Jayanti (2nd Oct. 2021) were celebrated on an online platform where the Flag unfurling and hoisting was done on I-Day and R-Day subsequently followed by singing of National Anthem. The events were open to National wide institutes, and which witnessed a huge number of participations.



2. Foundation day celebration- Photo session (Sept. 15. 2021)

On Sept. 15, 2021, the Material Advantage IIT Kanpur chapter's Foundation Day was celebrated with a photo session of the office bearers followed by social gathering and refreshments. The faculty advisor and Chair came forward and spoke about the benefits of Material Advantage memberships and urged students to be a part of it.

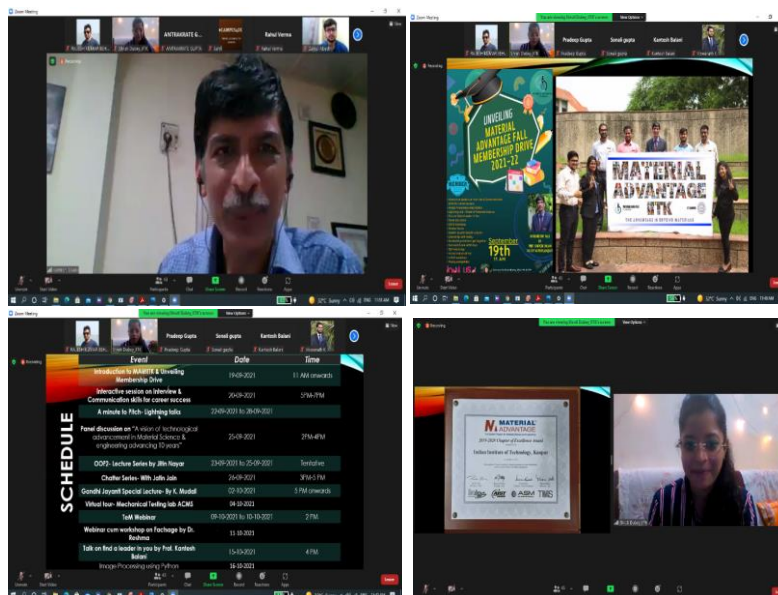


3. Unveiling Material Advantage Fall Membership Drive 2021-22 (Sept. 20, 2021)

Speakers: Prof Kantesh Balani and Ms. Shruti Dubey

On September 20, 2021, An Introductory talk was given by **Prof. Kantesh Balani**, Faculty Advisor, MA@IITK for Unveiling Material Advantage Fall Membership drive 2021-22. He briefed about every aspect of Material advantage and how it is associated with prominent societies: ACerS, AIST, ASM International, and TMS. He explained how advantage is beyond materials in Material Advantage. He also talked about how tremendously the Material Advantage@ IIT Kanpur chapter is growing on a global scale. All the Core team members of MA@IITK introduced themselves, shared their experience of being associated with it, and their vision for Material advantage.

Later, **Ms. Shruti Dubey**, Chair, MA@IITK unveiled the drive with the list of events that have been planned for the Material Advantage Fall Membership Drive 2021-22. Over 50+ participants from various departments and programs joined the session and clarified their queries regarding MA@IITK from Faculty Advisor, MA@IITK.



4. Tea Session with MA Members (Oct. 19.2021)

Since the arrival of Covid-19, the entire world has witnessed unparalleled events. The torture included mandated lockdowns with no social events, leaving us suffocating at home in virtual mode. Even in these unprecedented circumstances, the Material Advantage @IITK chapter has maintained the spirit alive by hosting a number of virtual activities, including seminars, webinars, understanding lectures, and Quiz events. With the end of lockdown and students' return to school, the MA @IITK branch was able to organize a Tea session and get-together. All MA members on campus (a total of 13) attended the session, talked with one another, and received a souvenir coffee cup from Mr. Zainul Abedin, the chapter Vice-chair. It was heartwarming to see MA members, as indicated in the photo below, enjoying an evening tea together.



5. MA@IITK Membership drive success party (Oct. 27, 2021)

Material Advantage at IIT Kanpur had a celebration to commemorate receiving the Chapter of Excellence award in the membership drive. There was a social gathering where the team reminisced about the events of the previous year while eating delicious food. Our faculty advisor, who was always putting a grin to everyone's face, made the evening full of fun and enthusiasm.



6. Pizza Party and Christmas celebration (Dec. 24, 2021)

AIST awarded Material Advantage @ IIT Kanpur a 'Pizza Grant' for the chapter meeting on December 24, 2021, which was the first offline event since the outbreak. Mr. Akhil spoke to the students about chances in the steel business as well as AIST as a society (grants, scholarships, opportunities, etc.). More than 40 students, the faculty chair, and prior faculty speakers from the Material Advantage society attended the conference.

After a two-year hiatus, the event brought students together to network. In addition, there will be wonderful pizzas and fruitful discussions. All the event attendees received a key chain with the Material Advantage Kanpur chapter logo. In addition, three pupils were chosen at random to receive a USB flash drive.



7. Barbeque Night with MA@IITK members by Faculty advisor (Mar. 26, 2022)

MA faculty advisor presented post-graduate, under-graduate students, non-teaching staff, research associate of the laboratory for biomaterials, and MA members with an annual treat. This is an informal dinning with the faculty advisor along with his family and the Material Advantage family @IITK. The guests savored awesome buffet dinner served at Barbeque nation in Kanpur. The Faculty Advisor, Material Advantage @ IITK thanked all the existing members for being a part of IITK chapter and urged more participation in future.



About Chapter Management

Our student activity is based on the three objectives:

1. To improve student member's academic ability and open doors for our members to communicate with established professional's working in the fields of metallurgy, materials, and related disciplines. Thus, a regular website was redeveloped: <http://www.iitk.ac.in/mse/materials>.
2. To outreach the community to the budding Engineer and to inspire students to become the future researcher. Hence various activities such as lectures series, quizzes, virtual workshops and webinars and online celebrations were arranged by our chapter with a huge participation in every activity.
3. Our student chapter encourages personal & professional skills, in view of this, student talks have to be arranged on metallurgy and material science aspects even outside the campus.

The Chapter is managed by an executive team along with the faculty Advisor, Prof. Kantesh Balani. The unique events that were put on by this year's executive team would not have been possible if not for the organizational structure in place. Throughout the year, the team communicated effectively to ensure things ran smoothly. The basic organization structure and the duties of executive team is listed in table below:

Responsibilities of the Executive Members:

Officer's Name	Position	Duty
Shruti Dubey	Chair	Conduction of all Chapter Events & meetings
Zainul Abedin	Vice-Chair	Takes charge in absence of Chair & supports the Chair whenever & wherever needed.
Shiven P	Secretary	Maintains chapter records, minutes of all meetings, coordinating with speakers for various talks.
Ankur Agnihotri	Treasurer	Oversees all the financial Affairs of the Chapter. Keeping bills, ledger, balance sheet and even bringing sponsors.

Jatin Jain	Publicity Coordinator	Publicizing the society & its events on groups and social media handles, bring more members to the community.
Akhil Kotha	Website Coordinator	Time to time updating of the local website.
Pooja Rani	Student Advisor & Spokesperson	Authoritative person to be contacted by students for any advice on membership, scholarships, workshops, or participation in events/conferences etc.
Rajesh Behera	Event Coordinator	Planning & conduction of events
Sonali Gupta and Pradeep Gupta	Undergraduate Coordinator	Spokesperson, advisor and connecting link for undergraduate students.

Management procedures:

General Meetings: Periodic General meetings occurred twice every month in the past academic year 2021-2022 and were attended by almost all the members of the executive team and the subordinate team appointed by them to discuss chapter activities. However, due to the lockdown situation during COVID-19, meetings have been conducted online using the ZOOM application for video conferencing till January 2022. Duties are assigned and updated, and events are planned during every meeting. General body meetings are also conducted bi-annually to get the feedback from peer members.

Elections: The chapter follows a democratic process for recruiting new office bearers. The position of Chair, Vice - Chair and Treasurer are decided during a general body meeting chaired by the faculty advisor and majority votes are taken for the nominees from the existing executive team. However, the other positions are circulated via google form where all the existing Material advantage members can fill their nominations and the selected candidates appear for an interview conducted for each profile. The chapter also introduced two new positions, Event Coordinator and Undergraduate Student coordinator, in the executive team for better functioning and networking. Open door policy followed by chapter advisor for any kind of Material Advantage related work.

Finances: The Treasurer handles all the finances and keeps the ledger. The bills are cleared only after his approval, and he maintains a proper, duly signed record for all of them so as to maintain transparency. The ledger is updated regularly, and all the expenses are discussed with the executive board during the meetings. Apart from this, the chapter also associates with local sponsors for various events.

Recruitment activities: The current term was a transition periodic of the pandemic, MA@IIT Kanpur has organized thirty-three events which blend of virtual and offline events. This denotes our allegiance of us to adapt to the change. The events were carefully coordinated to make Material Advantage multiskilled student chapter. The new students are welcomed with an introductory session on Material Advantage and the benefits of being a member. This session is chaired by the faculty advisor, along with core team of IITK chapter. Events are structured to imbibe its tag line among the students of materials fraternity. Our tagline at MA @ IITK is “The advantage is beyond materials”. The one-month long recruitment drive was one of the most successful events which increased the membership **by ~212% increase**. During this tenure we freshen up with a new logo. The chapter also has a dedicated *WhatsApp*, *Facebook* group/page and *YouTube* channel for better reach out and follow up. The team is has expanding its reach with *LinkedIn*. The student chapter is actively connected with all its members where seminars, workshops and conferences are organized for career and academic growth of the fellow members. In addition, fun games and meet ups organized now and then to ease them from academic stress. The various kinds of events conducted catch the attention of students at large to join the society

Chapter website: The website was updated periodically and was improvised to make it more user friendly. The website is also connected with the social media handles (i.e., Facebook, LinkedIn, WhatsApp).

Link: <http://www.iitk.ac.in/mse/materials>

Record Keeping/Documentation: Documentation of agendas/meeting notes, event organization, documents, photos, presentation, etc. are maintained on Google drive platform. The minutes of all meetings are drafted, and gist is circulated among all executive members. The list

of all the members is also maintained and the date of their membership renewal is intimated to the fellow members from time-to-time based on the database.

➤ *Material Advantage @ IITK Chapter ensures continuity of excellence from year to year*

Indian Institute of Technology (IIT) Kanpur became an official charter of Material Advantage in **September 2009**. Material Advantage @ IIT Kanpur has won the (i) “Most Creative Recruitment Strategy” award during **2021 Fall Membership Challenge** which includes citation and cash award of US \$500 (ii) prestigious “Chapter of excellence” award for the year 2020-2021 (iii) “Most Recruited Students” during **2019 Fall Membership Challenge** which includes citation and cash award of US \$1000 (iv) “Most Recruited Students” during **2020 Fall Membership Challenge** which includes citation and cash award of US \$1000 (v) prestigious “Chapter of excellence” award for the year 2019-2020 (vi) “Most Recruited Students” during **2019 Fall Membership Challenge** which includes citation and cash award of US \$1000, (vii) “Most Creative Recruitment Strategies Award” during the **2011 Fall Membership Challenge**, which includes citation and cash award of US \$250, and (viii) “**Most Recruited Students**” challenge for the **Fall 2009**, which includes citation in one of the AIST/ASM/ACerS/TMS journal and cash award of US \$500. Apart from this, the chapter also participated in the first ever “**ACerS Next Top Demo Competition**” in **April 2017** and grabbed the second position along with a cash prize of US \$150.

➤ *Participation in meetings and chapter events.*

A notable participation of members and students in all chapter events has been witnessed this A significant participation of members and students in all chapter events in this transition from online to offline mode. The featured events that attracted a lot of participants are talk on how to write a patent, panel discussion, webinars, and workshops, “Understanding...” and “Frontier” Lecture series, OOF2 workshop, LaTeX workshop, Origin workshop, Logo competition, MatAd quiz, skills for building a successful career, Two-minute thesis and Transmission electron microscopy National events and revive the mother earth photography events which turned out to be a full house. The student participation was a delight to watch and the efforts by Material

Advantage @ IITK were appreciated time-to-time by the Department of Material Science and engineering, IITK. The active participation of students has also been a highlight on the department's official social media handles, such as Facebook, twitter and LinkedIn, many a times. Involvement of students was not only confined to events, but also, the members were pro-active in volunteering and organizing them as well. The chapter stole the limelight of all and collective effect of efficient teamwork and enthusiastic members. The chapter is currently working upon to target more undergraduate students for membership and participation.

The recruitment of students into the Material Advantage Student Membership Program

The fall membership challenge has become one of the most awaited and celebrated times of Material Advantage @ IIT Kanpur Chapter. It is a month-long recruitment session where the students participate in various events conducted from time to time and the winners in each of them are provided certificates, souvenir, and even discounted membership in Material Advantage. The drive is open to all students including the existing material Advantage members. This promotes student participation and even membership. The executive team introduces new aspects to this challenge to make it more interesting and unique every coming year. In the year 2021, the chapter managed to conduct more than 20 events together in online and offline mode. The volunteers contacted students over phone calls and facetime over ZOOM during the e-membership helpdesk to guide interested students for membership. The 2021 fall membership challenge led to a ~ 70.8% growth in membership in over a month's time making it the most successful recruitment drive of Material Advantage @ IITK chapter even during the volatile situation. The chapter also won prize in the category of "Most creative Recruitment strategy" (prize money \$100).



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MA@IITK Website: <http://www.iitk.ac.in/mse/materials>



May 21, 2022

Support to Material Advantage @IIT for Chapter of Excellence Nomination

I wholeheartedly support the endeavors of **Material Advantage @ IIT Kanpur** (MA@IITK) for the academic year 2021-22 and its candidacy for the *Chapter of Excellence 2021-22*. Since the chapter's commencement in Fall 2009, I have been acting in the capacity of faculty advisor for the MA@IITK. It gives me great pleasure to watch Ms. Shruti Dubey serving as Chair of the chapter. She is quite capable in her role. The *energetic executive committee* has been led by her *remarkable energy* and a *systematic approach*, and as a result, the chapter has carried out many different sets of multi-pronged activities. These activities range from *programming* to *chapter management*, and from *service* to *career-development*.

Despite the partial lockdown imposed by the COVID-19 pandemic, MA@IITK has held technical virtual workshops (Sept 2021/ Oct 2021/ Apr 2022), published the chapter's newsletter, physically celebrated Foundation Day (Sept. 2021), revised the chapter's website, reached out to colleges (Aug 2021, Oct 2021), organized Interactive sessions (Jun 2021/ Sept 2021/ Dec 2021), Understanding- (National event)/Frontier-lecture- series (Jan 2022/ Feb 2022), MatAd Quiz (Aug 2021) and social events (Sep 2021/ Oct 2021/ Dec 2021/ Mar 2022). With the participation of students in various events, the current leadership has shown that distances don't matter. MA@IITK is shining on the global leader board after receiving the "Chapter Excellence Award 2020-21".

MA@IITK has become an essential component of the Materials Science and Engineering Department at IIT Kanpur and has created ripples across the country and globe with its activities. Over the years, it has organized a number of events, both technical and fun, to advance the field of materials science, and it will continue to do so in the future. As the chapter's faculty adviser, I am pleased to provide the *Material Advantage @ IIT Kanpur chapter* the ***greatest possible support in its pursuit of the Chapter of Excellence 2021-22***, particularly regarding the chapter's ongoing efforts and dedicated leadership.

With best regards

Dr. Kantesh Balani