



K.E. Society's  
Rajarambapu Institute of Technology  
Department Of Mechanical Engineering  
Team MESA



# THINK TANK

FUTURE OF ENGINEERING

## SHINING STARS OF RIT

Articles from top scholars of RIT  
Students as well as faculty  
members

**TEAM MESA**

**RIT** An association for the  
students and by the  
students

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ISSUE VOLUME NO.: EIGHT  
JUNE 2021

THINK TANK: MAGAZINE PUBLISHED BY MESA, RIT

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# **Section 1 :**

# **From the Desk**

## DIRECTOR OF THE INSTITUTE

RIT focuses on policy of imparting quality education to students through involvement & empowerment of our faculty with the ultimate aim of student satisfaction. We realize the responsibility of transforming a XII class student into a professional engineer within a period of four formative years. Hence, we ensure that the students should gain not just technical knowledge but also develop a holistic set of skills equipping them to face the real world.



In order to succeed in this competitive world, students need to have a good blend of the recent technologies and management skills to handle the organization. A lot of new technologies are prevailing in markets like artificial intelligence, machine learning, data analytics, and much more. Students should learn all these technologies so as to build a strong career ahead. That is the main reason behind the student associations so that students will learn the essential skills by themselves or under the guidance of faculties provided and will also encourage other students for the same.

I personally like the way the Mechanical engineering student association is working. As the association is completely driven by the students, students get to face a lot of real-world challenges which molds their confidence in an excellent way. The association always organizes webinars as per the industrial requirements.

Today's young generation is the future of tomorrow, so it's important to nurture and train them in a proper direction. In that regard, I would like to admire the Head of the Mechanical Engineering Department Dr. S.K.Patil and MESA Faculty Advisor Prof Prashant Jadhav for providing the right direction to the students. Also, the efforts taken by MESA President Miss Sakshi Kulkarni and her team in organizing various events and workshops is worth appreciating.

**-Dr. Mrs. S. S. Kulkarni  
Director, RIT.**

## HEAD OF MECHANICAL DEPARTMENT

Mechanical Engineering department is the largest and oldest department in RIT and most of the students from our department end up taking leading position in industry, academia, research institutes and government sectors.

Mechanical Engineering Students Association (MESA) is one of the important associations in our department as the students are leading the association. We promote the interaction between academia and industry by organizing industrial visits, special lectures and industrial training under MESA.

We always make sure that the requirements of students are fulfilled under MESA and we organize events wherein students will learn the real-world obstacles and how to overcome them.

Every year MESA organizes various events but this year in spite of the pandemic, the students have been working tremendously hard in organizing online events. They have arranged very unique events and webinars which are much needed for the students to understand. MESA is the first one to organize FACE IT event which is purely a technical event on the virtual platform. I can proudly say that the students were able to bring 50 + entries just in a single day which is a huge success for MESA.

In that regards, I would like to appreciate the efforts of Miss Sakshi Kulkarni, President of MESA and team for their outstanding efforts. The MESA Faculty Advisor Prof Prashant Jadhav has been guiding the students in an excellent way.

I would also like to thank honorable Dr.Mrs. Sushma Kulkarni – Director of RIT and Dr. L.M. Jugulkar - Dean Student Development for their support.



**- Dr. S. K. Patil**  
**HOD Mechanical Engg. Dept.**  
**& Dean Academics, RIT**

## MESA FACULTY ADVISOR

The activities of Mechanical Engineering Student's Association (MESA) are dedicated to support the educational mission of R.I.T, by providing students with a sense of community through meaningful interaction outside the classroom. The mission of MESA is grounded on the premise that every student is a leader capable of making a difference within RIT and beyond it. MESA is basically formed to bring about the technical development of students by organizing seminars, workshops and other activities and to also improve non-technical abilities of students by engendering good communication skills, managerial abilities, presentation skills and team work.



Though the activities of MESA, we always encourage students of the Mechanical Engineering department to develop their personal skills, like event management & time management by organizing inter & intra college events.

This year due to the pandemic, we had to arrange the events on the virtual platform, but the response that we are getting through the events is worth appreciating. The students have been working tremendously hard for organizing these events.

MESA has various other clubs included in it like the MECH-TALKS, clubs for students planning for overseas education, Masters and civil services which are completely driven by the students. Due to this, students not only acquire technical skills but also excel in extracurricular as well and are always eager to work on new projects. Every year MESA organizes TRAILBLAZER which is a national level symposium and the event is endorsed for two days.

I would like to thank Hon. Dr. Mrs. Sushma Kulkarni – Director of RIT, Dr. L. M. Jugulkar- Dean Student Development, Dr. S. K. Patil – Dean Academics and Head of Mechanical Engineering Department for their support. I would also like to appreciate the efforts taken by MESA President- Miss Sakshi Kulkarni and entire MESA Team.

**- Prof. Prashant S. Jadhav**  
**MESA Faculty Advisor**

## MESA PRESIDENT

MESA is Mechanical Engineering Students Association and all the activities in MESA are completely driven by the students, for the students. MESA has always been working to bridge the gap between students and faculties.

This year due to pandemic it was not possible for us to conduct offline events but we have tried our best and have conducted total 12 grand events on the virtual platform. We always make sure that the events organized are according to the industrial requirements and would help students in acquiring the essential skills.

This year we have made a unique collaboration of Education and Experience i.e the collaboration of two associations RAAH and MESA. The benefits under the collaboration include mentoring opportunities to students, intradepartmental club activities, internships, projects, etc. Apart from it, we have organized various webinars which include webinars on Profile Building and Placement Basics by Mrs. Pallavi Desai, Career path and Leadership Role for Women Engineers by Ms. Rama Kirloskar (Managing Director of Kirloskar Ebara Pumps Limited) & Basics of Excel by Prof Sachin khot. The response we get for all the events is amazing and more than expected.

Other events organized by MESA include celebration of Teachers Day, Engineer's day, Farewell, Introduction to the department, and competitions like Elocution competition and Face It.

I would like to thank Honorable Dr. Mrs. Sushma Kulkarni – Director of RIT, Dr. L. M. Jugulkar- Dean Student Development, Dr. S. K. Patil – Dean Academics and Head of Mechanical Engineering Department, Prof Prashant Jadhav- MESA Faculty Advisor and the entire MESA Team for their support and guidance.



**- Miss Sakshi Kulkarni**  
**MESA President**

**Section 2 :**  
**Events Arranged By**  
**Team MESA**



## “THE TEACHER IS A CANDLE WHO SPENDS THE WHOLE LIFE LIGHTING UP THE LIVES OF THE STUDENTS”

MESA had organized Teacher’s Day Celebration on 5th of September 2020. This function was organized to honor all the faculties on the occasion of Teacher’s Day. Teacher plays a very important role in shaping the lives of the students. They inspire students to succeed in each and every aspect of life. The function was organized on online mode on Microsoft Teams.



The function started by stating the importance of Teacher’s Day, why it is celebrated and the importance of teachers in the lives of students. Honorable Director of RIT Dr. Mrs. S. S Kulkarni expressed her thoughts and guided the students for their betterment. Honorable Dean Academics and Head of Mechanical Department Dr. S.K. Patil expressed his views.

Respected MESA Faculty Advisor Prof. Prashant Jadhav expressed his views. MESA President Miss Sakshi Kulkarni anchored and coordinated the function. All the faculties expressed their feelings and spoke about their journey in RIT. Students also participated actively by sharing their experiences about the faculties. Students had prepared a short and sweet video of achievements, which included the achievements of each faculty.

All the faculties and students were deeply happy with the celebration. Faculties promised students to help them in everything they need as always.



Students also promised to respect the faculties and develop a good relationship with them. In short, the celebration was a huge success. The celebration ended with the concluding remarks.



## “ENGINEERS ARE THE PERSONS WHO DISCOVER THE WORLD BY THEIR PEN AND BRAIN”

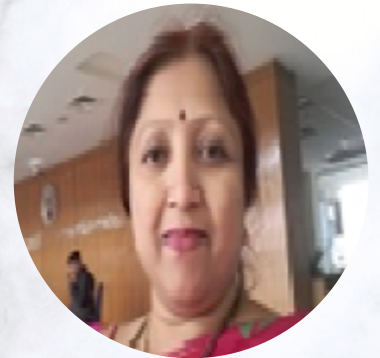
MESA had organized the Engineer's Day celebration on the 15th of September 2020. This function was organized to appreciate the contribution of engineers in the field of research and technology. Engineers, as practitioners of engineering, are professionals who invent, design, analyze, build and test machines to fulfill functional objectives and requirements. The function was organized on online mode on Microsoft Teams.



The function started by stating the importance of engineers in society and the contribution of Visvesvaraya (Father of Engineering) in the field of engineering. The chief guest for the event was Dr. Indumathi T. S. - Treasurer of ISTE New Delhi who spoke about the importance of Engineers in today's world.

Honorable Director of RIT Dr. Mrs. S. S Kulkarni expressed her thoughts and motivated the students. Honorable Dean Academics and Head of Mechanical Department Dr. S.K. Patil his views on the importance of engineers. Respected MESA Faculty Advisor Prof. Prashant Jadhav expressed his views. MESA President Miss Sakshi Kulkarni anchored and coordinated the function.

Some faculties shared their journey of engineering. Students also expressed their views on why did they chose engineering and what are their



Dr. Indumathi T. S .  
Treasurer, ISTE, New Delhi



experiences from when they took the admission for engineering. This function motivated the students and once again students learned the importance of engineering and what, as an engineer, they wish to do in the future for society. This function was a huge success. The celebration ended with the concluding remarks.



## FAREWELL CEREMONY

MESA had organized Farewell Ceremony for last year's students on the 27th of September 2020. This function was organized to bid a farewell and appreciate the 4 years journey of the students, wishing them good luck for their future endeavors. These 4 years of engineering teach not only the technical knowledge but also the life skills which help to live happily and satisfactorily. The function was organized on online mode on Microsoft Teams.



The function started by congratulating various students for their achievements in their entire engineering journey. Honorable Director of RIT Dr. Mrs. S. S Kulkarni expressed her thoughts, congratulated, and gave best wishes to the students.

Honorable Dean Academics and Head of Mechanical Department Dr. S.K. Patil expressed his views and congratulated the students. Respected MESA Faculty Advisor Prof. Prashant Jadhav expressed his views. MESA President Miss Sakshi Kulkarni anchored and coordinated the function. Some faculties shared their experiences while interacting and teaching the students. Some students from last year shared their experience and highlighted their 4 years engineering journey. It was an emotional moment for all. Juniors had prepared a sweet memories video for the last year's students. The video depicted their memories with their friends and faculties. This function was a grand success. The function ended with the concluding remarks.



## INTRODUCTION TO DEPARTMENT & FRESHER'S PARTY

MESA had organized the Introduction to Department function for second-year students on the 16th of December 2020. The students from second year Mechanical Engineering were introduced to the achievements of the department.

The function was organized on online mode on Microsoft Teams. The function started by congratulating various students for their achievements in the whole engineering journey.

Honorable Director of RIT Dr. Mrs. S. S Kulkarni expressed her thoughts and gave best wishes to the students. Honorable Dean Academics and Head of Mechanical Department Dr. S. K. Patil expressed his views and



welcomed the students. Respected MESA Faculty Advisor Prof. Prashant Jadhav expressed his views. MESA President Miss Sakshi Kulkarni anchored and coordinated the function. Faculties gave their introduction to the students and welcomed them to the department. Students also expressed their views.

A short video of achievements of all the faculties and sweet memories video was prepared for the students. Students of second year were very excited and happy to enter the department. Various technical, as well as non-technical games, were organized for the S.Y students. The function ended with the concluding remarks.



## MESA RAAH COLLABORATION

This year MESA has made a unique collaboration of Education and Experience which is a collaboration of students and alumina. Since it's a collaboration it took place in both ways. It discussed various points in which MESA and RAAH would be benefitted individually. The benefits which MESA would get through the collaboration included guidance for career opportunities, business forum, experience and mentoring, industrial visits and sponsorships.



The benefits of RAAH included help from the student association in various terms like Helping hand to RAAH and benefits in the TRAILBLAZER event.

Students planning for higher studies or specialization can be highly benefitted from the experience of RAAH members. The business forum can also be useful for students who have a strong desire to expand their existing business and build a strong network. As the alumni are working in different areas, under their guidance, students can visit different industries and acquire various skill sets and practical knowledge.

The involvement of a greater number of students will further form a good ALUMINI team in the future. Students in MESA not only acquire technical skills but also excel in extracurricular as well and are always eager to work on new projects. Hence MESA can always act as a helping hand to RAAH whenever required.



The collaboration was approved by Honorable Director of RIT- Dr. Mrs Sushma Kulkarni in the presence of respected Dr.S.K.Patil - Dean Academics and Head of Mechanical Engineering Department, Prof Prashant Jadhav - MESA Faculty Advisor and Prof.M.M.Mirza.

The collaboration was further approved by all the Mechanical engineering faculties and RAAH members. The collaboration was presented by Miss Sakshi Kulkarni- MESA President.





## INTRADEPARTMENTAL CLUB ACTIVITIES

MESA has come up with a unique idea of intradepartmental club activities. MESA has various other clubs included in it like the MECH-TALKS, clubs for students planning for overseas education, Masters and civil services which are completely driven by the students.



The basic idea behind arranging the activity is to help students solve their issues by themselves, maybe by their seniors or juniors. It's found that the students are most comfortable in discussing their



doubts with their friends than with a faculty. Students planning for higher education like MS, MTech, MBA, Civil Services will be sorted accordingly. Students with a common area of interest will come together after college and solve their doubts regarding a specific subject.

This would help them to understand the concept quickly and easily. Furthermore, a faculty will be appointed regarding a specific subject and specific classrooms will be allotted to the students for discussion. A survey of the students has been taken and the work is in progress.



## WEBINAR ON PROFILE BUILDING AND PLACEMENT BASICS

MESA had organized a two-day webinar on Profile building and placement basics on 14th and 15th of January 2021. The speaker was Mrs. Pallavi Desai. Mrs. Pallavi Desai is a career counselor and trains students for post graduate admissions to USA, Canada and Germany. The registrations for the event were 250+ just in two days. Profile building and placement basics is the need of the hour and every individual must have these skills



**Mrs. Pallavi Desai**  
MBA (HR and Marketing)  
M.Phil.(Business Administration)



to be competitive in this world. This webinar was organized in online mode on Zoom. Honorable Dean Academics and Head of Mechanical Department Dr. S.K. Patil guided the students regarding profile building. Respected MESA Faculty Advisor Prof. Prashant Jadhav expressed his views about learning profile building and placement skills. MESA President Miss Sakshi Kulkarni anchored and coordinated the webinar. The contents of the first day included the importance of LinkedIn account, how to manage it, a list of specialization areas, how to build a resume, and the experience of Mr. Sudhanshu Rankhambe (a student from RIT). The contents of the second day included verbal, logical aptitude tests, interview and group discussion skills, and the experience of Mr. Ranveer Patil and Mr. Shreyas Kulkarni.

The participants actively participated in the discussion and asked their queries. They got to learn a lot of things and skills from this webinar. The webinar was a huge success. The webinar ended with concluding remarks



## ELOCUTION COMPETITION

The Elocution Competition was organized by MESA on 7th Feb 2021. Five topics were already provided to the participants. The topics were:

- Life in COVID Times
- Future of Vehicles
- Online Education System
- Data Protection
- Way towards Automated Life

This webinar was conducted on online platform on Microsoft Teams. Honorable Director of RIT Dr. Mrs. Sushma Kulkarni explained the importance of Elocution Competition.

Dean Academics and Head of Mechanical Department Dr. S.K. Patil guided the students. Respected MESA Faculty advisor Prof. Prashant Jadhav also expressed his views about Elocution Competition and MESA. MESA President Miss Sakshi Kulkarni talked about MESA activities. MESA Vice President and Event Head Miss Gayatree Pawar anchored the competition. Prof. P.M. Jadhav and Prof Ms. Rahesha Mulla judged the event. Total 21 participants were registered for the event from different colleges, different background, and different cities. Registration for the event was free. All the participants were awarded a participation certificate.

The participants experienced the elocution competition first time in the online mode. They expressed their thoughts in very effective manner. Cash prize of total Rs. 3000 was awarded to the winners along with a certificate. The event was very helpful to all the participants' and it ended with concluding remarks.

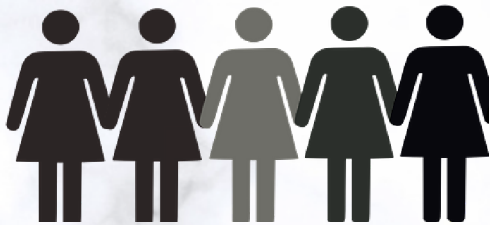


## WOMEN'S DAY

The webinar was arranged by ISTE-RIT chapter and MESA in association with ICC cell and NSS on the auspicious occasion of International Women's Day i.e 8th March 2021. The speaker of the webinar was Miss Rama Kirloskar- Managing Director of Kirloskar Ebara Pumps Limited. Previously, she was the General Manager and Head of the Product Portfolio Management at Kirloskar Brothers Limited where she was responsible for driving the Go-to-market strategy, product value management and restructuring for the mass-production business. She also holds a good command on material grade rationalization and streamlining for the foundry business and product



**Miss Rama Kirloskar**  
Managing Director  
Kirloskar Ebara Pumps Ltd.



rationalization for the made-to-order business. She holds a double major in Mathematics and Biology from Bryn Mawr College, USA. After graduation, she went on to work at Polaris Venture Partners, a multi-stage venture capital firm that principally invests in technology, healthcare and consumer products, headquartered at Waltham, MA, USA. Subsequently, she worked at the Koch Institute at Massachusetts Institute of Technology (MIT), USA. Her research led her and the team to begin working with Visterra Inc., an MIT biotechnology start-up company, that currently uses its proprietary platform to design therapeutics for infectious diseases.

The webinar was organized especially for the girls of RIT and was conducted on Microsoft Teams. Honorable Director of RIT- Dr. Mrs. Sushma Kulkarni guided the girls regarding the career opportunities.



Respected Miss Rama Kirloskar put forth various points regarding the opportunities that girls have in the industry, how to work on profile building, prerequisites required for getting placed in a good company, and much more. Miss Sakshi Kulkarni- MESA President had coordinated and anchored the webinar. Prof Prashant Jadhav - MESA Faculty Advisor and Dr. S. M. Sawant - Prof In charge alumni was the real driving force behind organizing the webinar. Dr. L. M. Jugulkar - Dean Student Development announced the winner of 'Maa Saraswati Award 2021'.

The participants actively participated in the discussion and asked their queries. They got to learn a lot of things and skills from this webinar and the webinar was a huge success. The webinar ended with the vote of thanks by Prof Supriya Sawant - Chairman of ICC cell.



## FACE IT (ONLINE)

MESA wanted to conduct a technical event which would be useful to all the students in learning the essential skills required in the corporate world and that's the reason why we decided to organize Face It event on 13th March 2021.

The event was organized on online mode on Google Meet. Honorable Dean Academics and Head of Mechanical Department Dr. S.K. Patil, Honorable Dean Student Development Dr. L.M. Jugulkar, Respected MESA Faculty Advisor Prof. Prashant Jadhav were present for the event. MESA President Miss Sakshi Kulkarni anchored and coordinated the event.



The event had total 3 rounds in it and depicted the actual recruitment process that takes place in a company. The total cash prize for the event was 3000 Rs.

1. Aptitude Test
2. Group Discussion
3. Interview

We had released the details of the event on 9th March and just in a single day the count of entries had reached 50 and the number was still increasing. But managing more than 50 entries would be a time-consuming and lengthy process. So, we restricted the entries up to 50. The entries included students from all departments and all years. Apart from it, students from BSc, BCOM, MBA and BBA had also participated.

There were students not only from different districts in Maharashtra like Sangli, Kolhapur, Satara, Pune but few students from Mysore had also participated.

The percentage of students from first year was a bit more as they would get the prior knowledge of the recruitment process right from the first year. Around 50-60% of students were from the first year.



The judges for the Interview were:

**Mr. Mayuresh Joshi**

Senior consultant project manager at Capgemini

**Mr. Rohit Adsule**

HR officer in Atlas Copco

**Prof. Prakash Jadhav**

Professor at Rajarambapu institute of technology.

The feedback from the students was amazing. They got to develop their communication skills from this event. Also, the judges loved this event very much. The event was truly a huge success. The event ended with concluding remarks.



## EXCEL FOR ENGINEERS

MESA had organized a webinar on Basics of Excel on 27th of March 2021. The speaker for the webinar was Prof. Sachin Khot from RIT. The main motive of this webinar was to clear the basics of Microsoft Excel as it is the need of an hour. Microsoft Excel is a very important tool which every engineer must learn. This webinar was conducted on online platform on Microsoft Teams. Honorable Dean Academics and Head of Mechanical Department Dr. S.K. Patil explained the importance of Excel. Respected MESA Faculty Advisor Prof. Prashant Jadhav expressed his views about learning Excel.



**Prof. Sachin Khot**  
Assistant Professor,  
Mechanical Dept., RIT



MESA President Miss Sakshi Kulkarni welcomed the speaker. Mr. Rohan Shah, publicity head of MESA and event head of this workshop had organized in wonderful way and who was the driving force of this event. MESA Vice President Miss Gayatree Pawar anchored the webinar.

Prof. Sachin Khot explained each and every basic concept of Excel in a perfect way. The webinar also included hands-on practice of various concepts of Excel. Total 75 participants were present for the webinar. All the participants actively participated in the webinar.

The participants got to learn a lot of concepts from Excel which they were not aware of, before the webinar. As a whole, the webinar was a very productive one. The webinar ended with concluding remarks.





## TRAILBLAZER 2020

The event was organized on 2nd and 3rd March of 2020. The Planning and the committee for the event was formed in the first week of January 2020, with Mr. Mayuresh Pachore as Trailblazer Head, Mr. Sunil Alder as Campaigning Head and Dhanshreya Bharate as Decoration Head.

In Second week of January the committee decided to keep nine events six technical and three non-technical and under Trailblazer 2020. The events were CAD Master, Hunt the Bug, Business Badshah, Face It, Poster Presentation, Lathe Legends, Futsal, Treasure Hunt, IPL Auction.

The event was organized by the MESA office bearers including Mr. Prassana Rasal President, MESA under the guidance of Prof. P. S. Jadhav MESA Faculty Advisor.

The campaigning was decided to start six weeks prior the date of event by Mr. Sunil Alder Campaigning Head. The Campaigning team was formed and planning was done as per different college schedules and find the college details and was decided that the campaigning will be done two time at least in each college. The colleges where Y.C. Poly, PVPIT, JPK, DKTE, SIT, JJM, WCE, Gov. Poly. Karad, Karad Government and many more.

Some medical field colleges where also campaigned. The Event had total 500 entries from the campaigning from which 132 entries where from non-technical background like medical agriculture etc and 120 spot entries form colleges other that RIT. Their where total 420 outsider participants in the Event.

The Decoration Team was formed one month prior the event by Mr. Dhanshreya Bharate Decoration Head. The theme was decided and the work begin one week prior the event at huge motivational level and was completed two days before the event.



On 02/03/2020 Monday 10:00 am the inauguration ceremony was held at RIT video conference hall under the proceedings of Mr. Ramesh Chavan, Sr GM, Kirloskar Oil Engine, Dr. S. S. Kulkarni- Director RIT, Dr. S. K. Patil - HOD of Department of Mechanical, and Dean Academics, Prof P. S. Jadhav MESA Faculty Advisor. The chief guest Mr. Ramesh Chavan directed the participants towards the way of modern engineers and motivated the participants. The director Dr. S. S. Kulkarni motivated the participants for a healthy competition.

The lunch was kept for every student who participated in the event for complete two days.

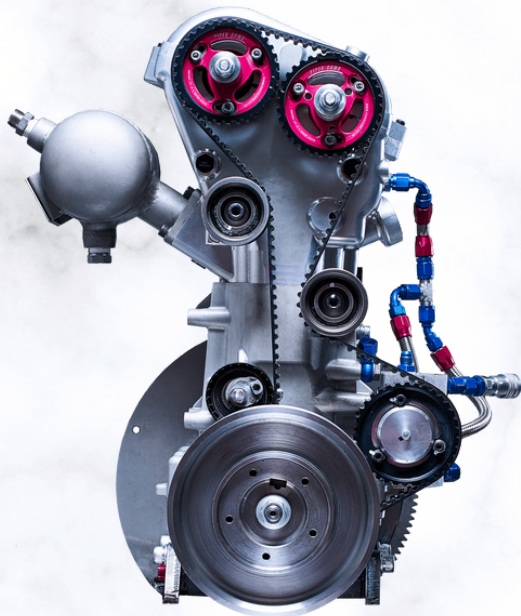
At last, on 03/03/2020 Tuesday at 04:30 pm Prize distribution ceremony was held. Various students from DKTE, Karad govt. and many more were awarded various prizes. All the efforts are taken by the students for making the event a grand success were appreciated by faculties. And finally, the event ended with huge success.



**Section 3 :**  
**Articles by Students,**  
**Faculty & Alumni of RIT**

## DEARMAN ENGINE

Today the world is facing the problem of climate change which is caused by pollution because of the gases released from combustion processes like coal burning plants, cars, diesel powered machines. The gases released are called greenhouse gases and it is also causing health risks. The efforts are being made to control the pollution through research in combustion, alternative fuels. Electric vehicles are another feat of engineering to combat the pollution problem. But the research is carried out to improve the battery efficiency that limits its usage and capital cost is too high. One of the inventions is called Dearman Engine which will be able to replace the conventional diesel engine. The Dearman engine can serve as an efficient and zero-emission engine to replace the highly polluting secondary diesel units used on trucks today.



First step of the process begins as return stroke when the e warm heat exchange fluid (HEF) enters the cylinder. As the piston travels towards top dead center, HEF is compressed and the liquid nitrogen or liquid air is pumped into the chamber.

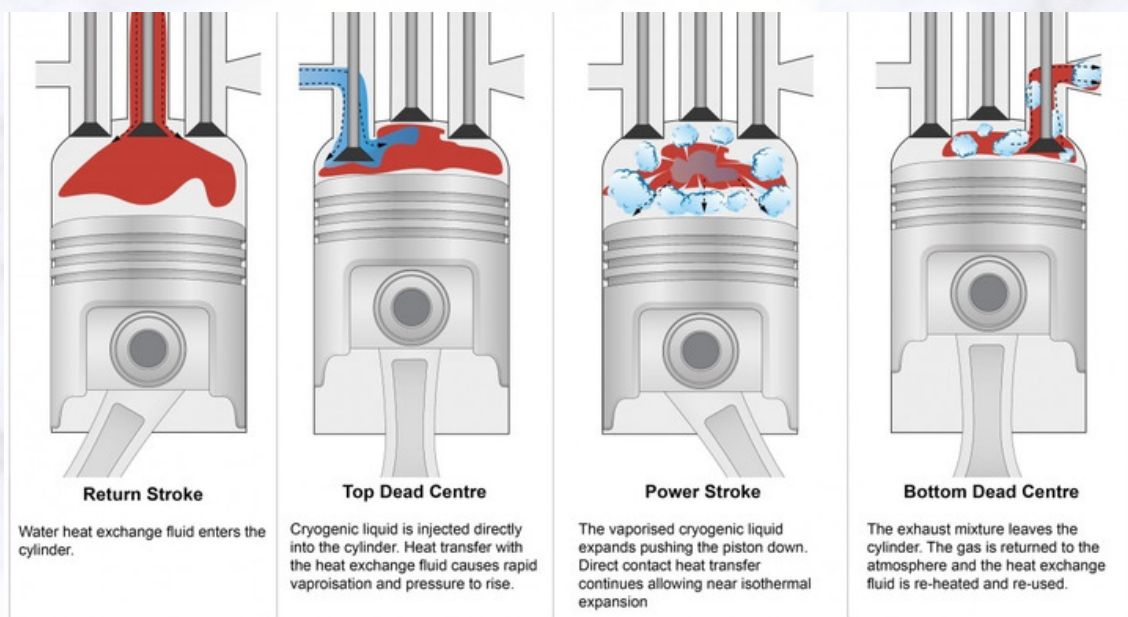


Mr. Mandar Govind Page  
T. Y. BTech Mechanical  
RIT

It was developed by Peter Dearman. Dearman engine draws inspiration from conventional steam engine. But the change is instead of heating water to steam and using it as working fluid. It is an efficient Rankine cycle expander powered by waste heat and liquid Nitrogen or liquid Air. It is simple, cheap since the cost is like that of the IC engine. Also, the liquid Nitrogen is commonly available industrial gas. The Dearman engine operates by boiling liquid air or nitrogen to produce high pressure gas that can be used to work. It consists of four strokes.

The Nitrogen or air becomes gaseous, expanding rapidly with relatively stable temperature (The process is nearly isothermal). This expansion pushes the piston down resulting into power stroke. And momentum of drive shaft pushes the piston upwards and expels the gas and water out of the chamber. Then the piston travels downwards and process continues.

It is made from simple materials like plastics and additive manufacturing processes are used. It uses waste heat. Fuel is noncombustible so exhaust produced does not contain NOX, SOX or any other greenhouse gases. Liquid Nitrogen is commonly available because of development in the cryogenic technology. Dearman is already working on using the technology for various applications. The Dearman engine with liquid nitrogen is idea for cooling, the technology is also used for Dearman Genset, which will be able to replace diesel gensets. Since it uses the liquid nitrogen, it can be used in environments that requires cooling.



## WHAT IS ARTIFICIAL INTELLIGENCE ?

We all may have heard about this term in many articles, newspapers, books, etc. which describe it as the new upcoming technology. There are many definitions of AI. Although there is no uniformly agreed upon definition, AI generally is thought to refer to “machines that respond to stimulation consistent with traditional responses from humans, given the human capacity for contemplation, judgment and or system endowed with the intellectual processes characteristic of ” . In simple words, something that has the intelligence of

decision making just like we humans do. The algorithms are designed to make decisions, often using real-time data. They are unlike passive machines that are capable only of mechanical or predetermined responses. Using sensors, digital data, or remote inputs, they combine information from a variety of different sources, analyze the material instantly, and act on the insights derived from those data.

Artificial intelligence is already altering the world and raising important questions for society, the economy, and governance. Intelligence and adaptability are the two major reasons the world is shifting to AI



**Mr. Rohan Ritesh Shah**  
T. Y. BTech Mechanical  
RIT



### 1) Intelligence

AI generally is undertaken in conjunction with machine learning and data analytics. Machine learning takes data and looks for underlying trends. If it spots something that is relevant for a practical problem, software designers can take that knowledge and use it to

analyze specific issues. All that is required are data that are sufficiently robust that algorithms can discern useful patterns. Data can come in the form of digital information, satellite imagery, visual information, text, or unstructured data.

## 2) Adaptability

AI systems have the ability to learn and adapt as they make decisions. In the transportation area, for example, semi-autonomous vehicles have tools that let drivers and vehicles know about upcoming congestion, potholes, highway construction, or other possible traffic impediments. Vehicles can take advantage of the experience of other vehicles on the road, without human involvement, and the entire corpus of their achieved “experience” is immediately and fully transferable to other similarly configured vehicles. Their advanced algorithms, sensors, and cameras incorporate experience in current operations, and use dashboards and visual displays to present information in real time so human drivers are able to make sense of ongoing traffic and vehicular conditions. And in the case of fully autonomous vehicles, advanced systems can completely control the car or truck, and make all the navigational decisions.

Coming towards its applications, many people actually don't know that they use AI in their day-to-day life. The first one already mentioned above is Google maps. Other than that, it is used in various apps in your mobile phone such as storing the location of the



Robot Sophia- one of the greatest achievements in the field of artificial intelligence

picture clicked and attaching it to the image, the auto correction feature used in keyboards, Spelling and grammatical mistake correction in Microsoft, continuously monitoring of heart rate using smart bands, the most known website Google also uses AI to predict the search and give the desired output based on your previous searches , etc. AI is applicable in many other sectors such as health care, national security, transportation, finance, etc. The Robot Sophia which is one of the biggest achievement in the field of artificial intelligence.

To summarize, the world is on the cusp of revolutionizing many sectors through artificial intelligence and data analytics. There already are significant deployments in finance, national security, health care, criminal justice, transportation, and smart cities that have altered decision-making, business models, risk mitigation, and system performance. These developments are generating substantial economic as well as social benefits and unfolding the drawbacks of AI.





## SUPPLY CHAIN MANAGEMENT & ITS TECHNOLOGICAL TRENDS

Supply Chain Management is the flow of goods and services and includes all processes that transform raw materials into final products. In other words, Supply Chain Management is related to handling the entire production flow of goods, starting from the procurement of raw materials to delivering the final product to the customer. Supply Chain is a very crucial part of every organization whether small or large. Supply Chain Management aims to reduce the waste wherever possible, improve the quality of customer experience. Other goals of SCM include faster delivery, higher efficiency, and accelerated cash flow. Supply Chains are the base foundation, without which businesses cannot survive at all. SCM is a very broad field that includes areas such as Purchasing, Manufacturing, Inventory Management, Demand Planning, Warehousing, Transportation, and Customer Service. For example, The packaging material which we use for packaging comes from an aluminum foil company while the foil company receives raw material from other suppliers. This is a simple example of supply chain. The supply chain begins with the customer and the need for him to buy the product.



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Technology has led the way in making supply chain much faster and more efficient. Nowadays, companies are investing in supply chain technologies to improve the efficiency, labor costs and reducing errors in manual processes. 3D Printing, Drones,

Augmented reality, Artificial intelligence, blockchain, IOT, big data analytics, machine learning, digitization are the technologies which will influence the future supply chains. Supply Chain Digitization will lead to faster, efficient, effective, flexible, granular, accurate supply chains. Nowadays computerized shipping and tracking, electronic invoicing are the core components of modern supply chain systems that are used to keep the customers satisfied. Software programming, cloud computing, artificial intelligence has greatly enhanced tracking of materials and products with real-time updates. They also help in production scheduling and inventory optimization. By making



use of technologies like AI and machine learning, companies can automate warehouse operations, improve delivery times, manage inventory, create new customer experiences that lead to customer satisfaction. Some of the large scale companies that make use of new technologies for enhancement of supply chains are John Deere, Nike, Walmart, Amazon and many more. The coca cola company is one of the largest supply chain management company in the entire world. From cutting costs to

reducing production errors and improving customer service, technology is providing a bunch of supply chain benefits to companies and industries across the globe.

Supply Chain Management is thus very important in achieving the goals and objectives of the companies. Implementing new technologies will help companies achieve their dream target in a very less period of time. **It is rightly said by Dave Waters, "Supply Chain is like nature, it is all around us".**



## DEUTSCHE SPRACHE UND IHRE KULTUR

Die deutsche Kultur ist einzigartig wegen der Geschichte Europas, der Traditionen, der Sprache und der Menschen . Etwa 95% der Menschen in Deutschland sprechen die deutsche Sprache. Es gehört zu den 23 Sprachen, die in Deutschland gesprochen werden. Englisch, Friesisch und Niederländisch sind einige der anderen Sprachen, die in Deutschland gesprochen werden. Deutschland ist die Heimat großer Automobilunternehmen und eines der führenden Länder für technologische



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Innovationen. Audi, Volkswagen, BMW und Mercedes-Benz haben ihren Ursprung in Deutschland. Deutschland ist bekannt für die Literatur. Jedes Jahr erscheinen 94000 neue Bücher. Die internationale Frankfurter Buchmesse findet in Deutschland statt. „Der

Weihnachtsbaum“ in Dortmund ist der Höchste in der ganzen Welt. Er hat eine Höhe von 45 Metern und ein Gewicht von 40000 Kilogramm. Es wird 50000 Lichter, Lampen und Dekorationsmittel aufgehängt. Zusätzlich ist „Ulmer Münster“ in Ulm die höchste Kirche der Welt. Sie hat 53 Stufen. Deutschland hat ein



außergewöhnliches Zugnetz , eine 12993 Kilometer lange Autobahn, die die deutschen Großstädte verbindet. Das deutsche Essen ist sehr reich und enthält eine Menge leckeren und traditionellen Speisen . Es gibt 300 Sorten der Brote und die Deutschen lieben ihre „Brotzeit“. Die Deutschen sind pünktlich, ordentlich. Sie hassen es, auf jemanden zu warten. Eine beste Eigenschaft der Deutschen ist „um einander kümmern“.

## German Language and its Culture (Translation):

The German culture is unique due to the history of Europe, traditions, language, and people. About 95% of the people in Germany speak the German language, which is commonly known as Deutsch in Germany. It is among the 23 languages that are spoken in Germany. In addition to this, English, Frisian, and Dutch are also some of the other languages which are



spoken in Germany. Germany is the home of large automobile companies and is one of the leading countries for technological innovation. Audi, Volkswagen, BMW and Mercedes-Benz, all have their origins in Germany. Germany is one of the leading nations when it comes to literature. The German publishers publish around 94000

new books every year and the most important book event in the world, the International Frankfurt Book Fair is held in Germany. Dortmund Xmas tree in Germany is the largest in the entire world with a height of 45m and weight of 40,000 kilograms and almost 50,000 lights, lamps, and ornaments are hung on it. In addition to this, the Ulmer Münster in Ulm is the tallest church in the world with a steeple measuring 530 ft. Germany is known for its exceptional



rail network and Autobahn, a highway stretching 12,993 kilometers (8,073 miles) that connects Germany's major cities. German cuisine is rich and includes different types of delicious traditional foods. There are 300 bread varieties available in Germany and is referred to as "Brotzeit", which means snack time in Germany. Germans are incredibly punctual and organized and most Germans don't expect to wait around for anyone. One of the best traits of the German people and culture is that they like to take care of each other.

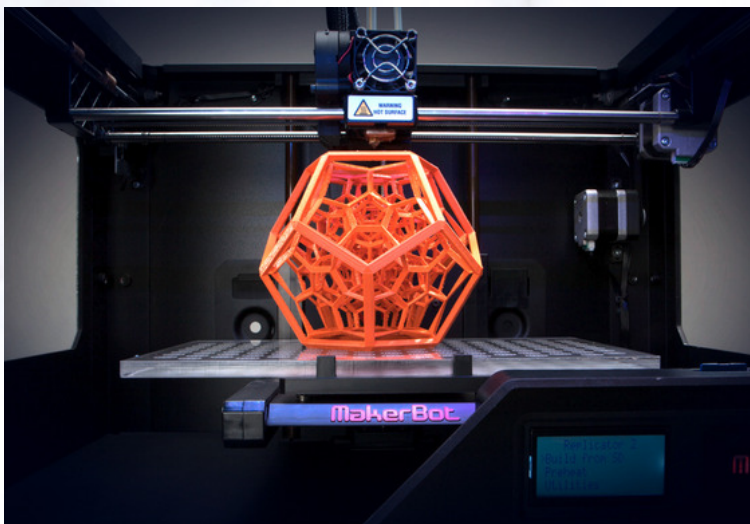


## ADDITIVE MANUFACTURING TECHNOLOGIES

Additive manufacturing (AM) or additive layer manufacturing (ALM) is the industrial production name for 3D printing, a computer controlled process that creates three dimensional objects by depositing materials, usually in layers. 3D printing or additive manufacturing, creates physical objects from a geometrical representation by successive addition of materials. 3D printing technology is a fast-emerging technology. Nowadays, 3D Printing is widely used in the world. 3D printing technology

increasingly used for the mass customization, production of any types of open source designs in the field of agriculture, in healthcare, automotive industry, locomotive industry and aviation industries. 3D printing technology can print an object layer by layer deposition of material directly from a computer aided design (CAD) model ,due to the fact that instead of removing material to create a part, the process adds material in successive patterns to create the desired shape.

3D printing can give life to your idea in shorter time, and without making a hole in your pocket. It can transform your idea into an object and help you explore imaginations. This technology is constantly evolving, which is why 3D printing services in India is getting into the mainstream

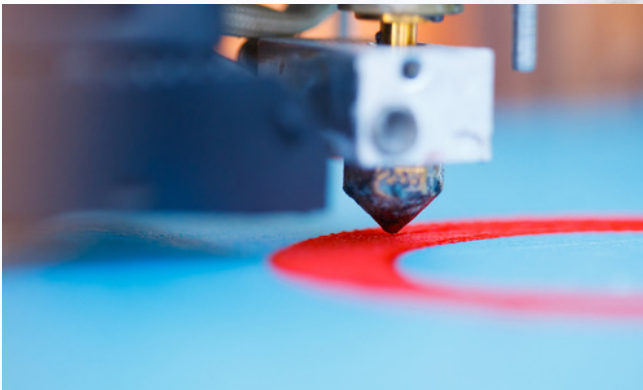
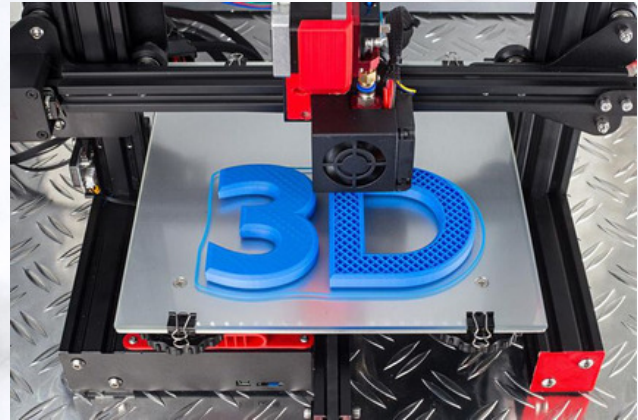


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Easy, fast, and in-expensive prototypes.

A prototype of your idea is necessary before marketing it. While the traditional method of prototyping is expensive, and time-consuming, 3D printing can create it in a few hours and without much investment.

Testing it and making changes in the 3D model is also possible and cost saving. If you don't own a 3D printing, contact a 3D printing company in India and seek rapid prototyping services. You just have to upload the 3D model on their website, and they deliver the 3D printed object to your doorstep.



In the modern era of technology our imagination should have platform to express it in a better way instead of searching different ways to make it in to reality. In Additive manufacturing 3d printing can helps to implement in proper way.



## EDUCATIONAL OPPORTUNITIES IN TAIWAN FOR INDIANS

Few months ago, a Taiwanese business weekly's cover story was all about the India opportunity. It included an anecdote about one businessman telling another that India might initially be a tougher place to do business than China, but it was nonetheless worthwhile and, crucially, would not be fatal over time. The idea of the India opportunity (and option) is also present in Taiwan's New Southbound Policy (NSP), which seeks to expand links with countries across South and Southeast Asia. There have been previous Taiwanese efforts to look beyond this region. However, this time, there's an emphasis on building economic and people-to-people ties, as well as a greater focus on India



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As Taipei looks to the south, there is opportunity for broader and deeper engagement, especially as India “acts east”—an approach that includes economic, technological, and cultural engagement with Taiwan (as well as quieter security cooperation). But any interactions will have to take place in the context of India's relations with China. That country looms even larger for Delhi than it has in the past. India's China relationship has elements of cooperation, competition, and, potentially, conflict, and, like many countries, India has attempted to engage, as well as compete with Beijing. It has stressed the need for the two countries to respect each other's sensitivities. In India's case, this has meant taking cognizance of Beijing's Taiwan sensitivities, while declining for the last decade to reaffirm its earlier support

for a One China policy explicitly—implicitly and occasionally explicitly linking it to a Chinese affirmation of a One India Policy, which is unlikely to be forthcoming. This delicate dance was evident in state-owned Air India’s decision to switch to using “Chinese Taipei,” but not go as far as Beijing’s demand to use “Taiwan, China.” Overall, though, India’s relationship with China imposes certain constraints on the way India-Taiwan relations can develop (particularly officially).

This will require Taipei to think creatively. Beyond the under-the-radar political, defense, and intelligence links that India and Taiwan maintain, it will need to identify areas where interests are complementary or it can engage stakeholders, create constituencies, and increase its visibility beyond official circles in Delhi. To some degree, there have been steps taken under the NSP that fit these categories. But there are further opportunities on the table, some that fit under the NSP rubric and some that go beyond it. This piece looks at a few Tourism, economic links, and people-to-people ties can also be positively affected by—and, in turn, affect—increased educational and employment ties, as well as exchanges between Indians and Taiwanese more broadly.

Over the last seven years, Taipei has established seven Taiwan Education Centers, which can be leveraged further under the NSP’s Talent Development Program. These TECs teach Mandarin, as well as Chinese culture and history. The Taiwanese ministry of education has been subsidizing teachers to participate in these programs in India. It should consider including time in Taiwan for students as part of the program. This will give them the immersion they need, but also help create a direct link. Moreover, there is a lot more scope for such language training both in India and Taiwan. Delhi, on its part, should encourage and facilitate such cooperation, including from a regulatory perspective (for example, making it easier for Taiwanese teachers to work in India). The government, private, and even non-profit sectors need more Mandarin speakers, and Taiwan could be part of the answer. The education sector more broadly—where Taiwan has capacity and India needs capacity—offers opportunity. In 2017, there were 1,532 Indian students in Taiwan (though this is more than double the number in 2015). To put this number in perspective, there are more than a half-million Indians studying abroad.

Taiwan’s expanded scholarship program, particularly for professional and vocational courses, could not only help increase this number;



it would also sit with the Indian government's Skill India program. Moreover, Taipei should consider working with its companies—particularly those that might be interested in doing business in/with India—to increase these scholarships, as well as create apprenticeships or internships for Indian students. (This is already being done for students from Southeast Asia.) Such efforts could be mutually beneficial, providing work experience for the students and giving the companies access to skilled individuals familiar with India. A few other steps could make Taiwan an attractive destination for Indian students. The Taipei Economic and Cultural Center (TECC) in India office—and Taiwanese universities—need to make students aware of the opportunities available (and alleviate any concerns that English-language courses are not an option), including through roadshows. Moreover, Delhi and Taipei should work together to ensure that degrees and diplomas are recognized in the other country. In addition, although Taipei has made it easier for foreign students to apply for work permits, it might want to consider including employment permission with a student visa. The U.S. student visa, for example, comes with a one-to-three-year optional practical training option after graduation. This will help attract more students and give Taiwan access to the high-skilled workers that it needs. There currently are only about 1,500 Indians working in Taiwan. But this is another potentially mutually beneficial space. There are more than 13 million Indian citizens abroad (not including the nearly 18 million persons of Indian origin). This is why negotiating labor market access has been a high priority for the Indian government and a sticking point in trade deals (e.g., the Regional Comprehensive Economic Partnership). And that access has been getting tougher in a number of countries where Indians have traditionally gone to work or study: Australia (to some extent), Britain, Singapore, and the United States. Here India and Taiwan have complementary interests: Taiwan needs skilled workers; India has them. Finally, the two sides should strive to increase and institutionalize regular exchanges—among scholars, analysts, journalists, entrepreneurs, and civil society leaders—in different sectors. This will increase awareness of the other country, sharing of perspectives, and learning about opportunities for cooperation. Here the United States could play a role. Conferences and exchanges that include Indian and Taiwanese participants can facilitate greater people-to-people interaction.

Moreover, the U.S. administration, which has tended to follow a South Asia or East Asia theme for its International Visitor Leadership Program (IVLP)-like programs, should consider an Indo-Pacific theme that can include participants from India and Taiwan.



## UNDERSTANDING PLASTIC RECYCLING

Plastics were mass produced in 1907 after Belgian-American chemist Leo Baekeland created Bakelite. The century ahead would change the way our planet consumed this material. Today, we cannot imagine our existence without plastics. This material is extremely versatile, can be tailored to meet specific technical needs, light in weight, good safety and hygiene properties. It has great durability and longevity, resistance to chemicals, water and impact, excellent thermal and electrical insulation properties. It has low production cost and its unique ability to combine with other materials makes it a very attractive material to work with. However, this material has disadvantages too: In the production of plastics, potentially harmful chemicals are used as stabilizers or colorants. The disposal of plastics products contributes to a substantial negative environmental impact and most plastics are not bio-degradable and they may take a long time to break down. The landfill space required to dump plastic waste is a growing concern. Various Solutions to recycle plastics to this growing menace of plastics is to recycle them which involves:

### 1. Chemical Recycling of Plastic.

Plastics are made up of long-chain molecules known as polymers, which consist of smaller repeating building blocks called monomers. These monomers come in different shapes and sizes. The bonding between them determines the plastic's material properties such as melting temperature and toughness - which affects the way it is used. Chemical recycling breaks the plastic down at a molecular level. This means the monomer can be recovered in what's called closed-loop recycling or the plastic waste can be transformed into other higher-value chemicals in open-loop recycling. For many types of plastic, it's possible to recover monomers or other useful materials.



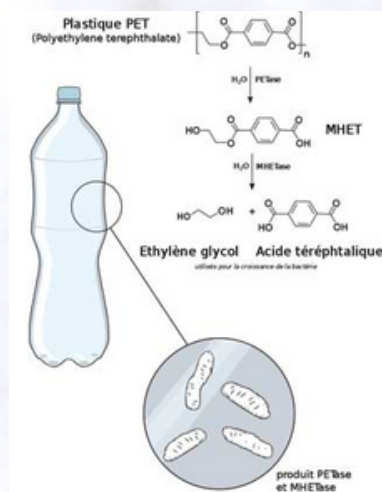
Mr. Vyas Khanna  
AWS Cloud Engineer  
& Proud Alumni of RIT

## 2. Use of Pyrolysis.

Some plastics, such as polyolefins – the material in a polyethylene plastic bag. They don't have weak monomer links, making it harder to chemically recycle them. In such cases, a process called pyrolysis is used. This is a different process which relies on high reaction temperatures to typically produce fuels and waxes.

## 3. Use of Enzymes / Bacteria that eat plastics.

Lately, enzymes that can break down plastics have been reported. However, these processes are limited by their productivity and require specific process conditions – such as the right temperature and pH – to keep the

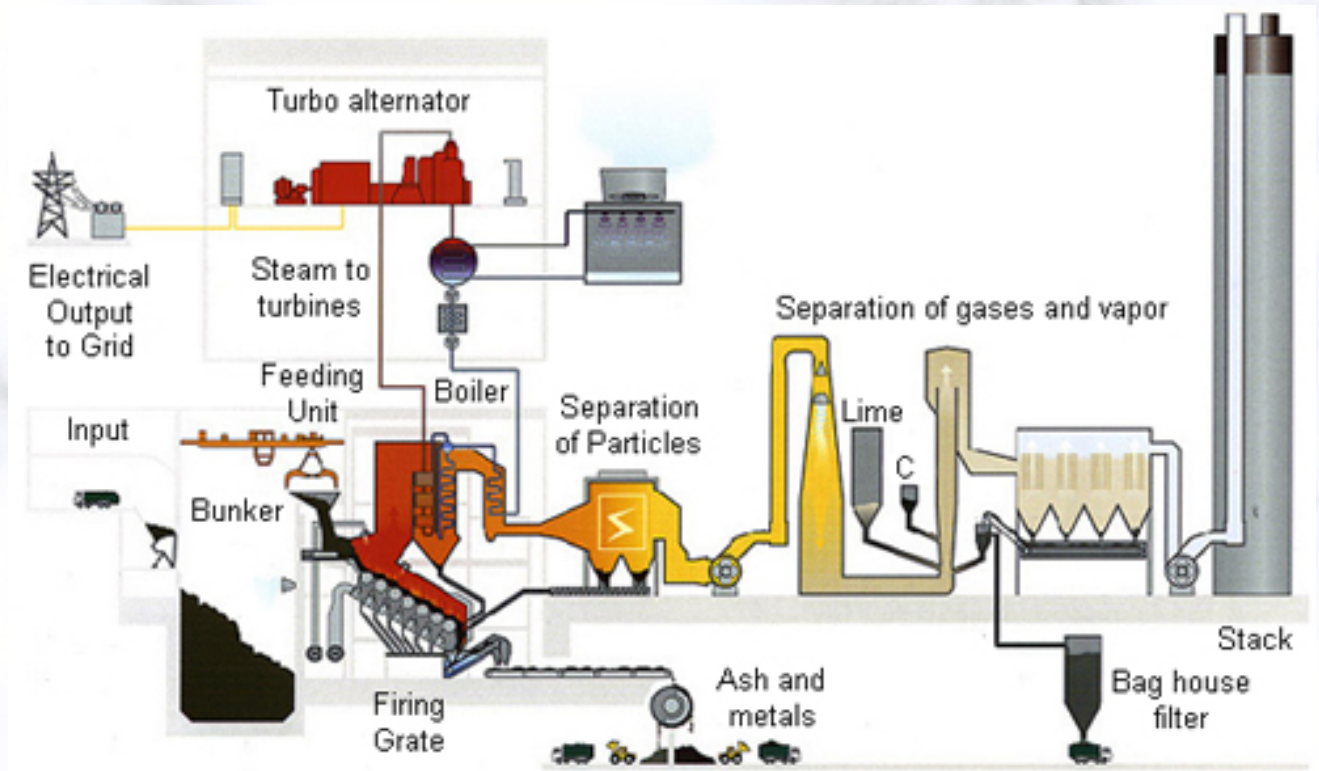


enzyme active. *Ideonella sakaiensis* is a bacteria capable of breaking down and consuming the plastic polyethylene terephthalate (PET) as a sole

carbon and energy source. These organisms produce two enzymes that help them break down PET within weeks. Scientists have dubbed the enzymes PETase and MHETase.

## 4. Incinerating plastics for energy generation.

Plastic waste can be burned to recover energy from them. An example here is Sweden. Only 1% of Sweden's trash is sent to landfills. By burning trash, another 52% is converted into energy and the remaining 47% gets recycled. The amount of energy generated from waste alone provides heating to one million homes and electricity to 250,000. Sweden is not only saving money by replacing fossil fuel with waste to produce energy; it is generating 100 million USD annually by importing trash and recycling the waste produced by other countries. The United Kingdom, Norway, Ireland and Italy are willing to pay 43 USD for every ton of waste that Sweden imports to this end.



### 5. Plastics used in road construction -

Addition of recycled or waste LDPE, high-density polyethylene (HDPE), plastics, and polyvinyl chloride (PVC) with asphalt improves the stability, tensile strength, stiffness, void characteristics



### 6. Re-Using Plastic Waste

Various objects made out of plastic waste like plastic bricks, textiles for fashion or other fibres etc. - The cost of producing RPET(Recycled-PET) is approximately 37 cents per lb as against the virgin resin price of 55-60 cents per lb. RPET, therefore, provides a cost avoidance of 18-28 cents per lb to fiber manufacturers. RPET is penetrating into visible, high-fashion applications for knit, fleece, and woven textiles where it will fetch even higher profit.

Today, technology is being developed to create Bioplastics. Biologically synthesized plastics (also called bioplastics or biobased plastics) are plastics produced from renewable biomass sources, such as vegetable fats and oils, corn starch, straw, woodchips, sawdust, recycled food waste, etc. Bioplastic can be made from agricultural by-products and also from used plastics (i.e. plastic bottles and other containers) by using microorganisms. Bioplastics are usually derived from sugar derivatives, including starch, cellulose, and lactic acid. Common plastics, such as fossil-fuel plastics (also called petrobased polymers) are derived from petroleum or natural gas. In addition to being decoupled from the petrochemical industry, bioplastics are attractive because they are biodegradable.

*Bio-based plastics are made from a wide range of renewable **BIO-BASED** feedstocks.*



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Published by :  
MESA, RIT

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