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Mr. Prakash Balasubramanian	Treasurer
Dr. Priyanshu Bajaj	Editor, News Letter

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Chairman's Message



Industry and the economy finally seem to be settling down after the Trauma unleashed by the pandemic over the last 16 months. With the unfortunate demise of Mr. Pratap Ghorpade on dt. 10th June 2021, we lost another former member of the Bengaluru Chapter. Nevertheless, ASM Bengaluru chapter has been active through Virtual engagements in the form of EC meetings and Bi monthly Technical Talks. Recent Highlights of the Chapters activities include: (1) The formation of a Material Advantage

Chapter comprising Students, with the Patronage of RV College of Engineering and the persistent efforts of our current Secretary Dr. Nataraj J. R. (2) Conducting of an In House Training Programme on “Failure Analysis” for AISIN Automotive, A multinational located at Bengaluru. (3) The Author and Mr. Prakash Balasubramaniam, Chapter Treasurer, participated in the Leadership Days program held in the month of July, which also was a Virtual Event.

What was evidenced in the Leadership Days programme was the predominant spirit of voluntary service by the members and the leadership of ASM primarily towards fellow members and to the community of Materials Science professionals. It is the authors invitation to all our members to participate actively in all the chapter affairs with this spirit of contribution which is the driving force in ASM world over.

We have just had our first physical EC meeting after a long time and now look forward to our next big event “The Materials Day” to be had in the Month of October 2021. Details will be circulated shortly. We take this opportunity to invite your participation in making this event a Great Success.

Rahul Masurekar

About ASM International

ASM International formerly known as the American Society for Metals was established in 1913 as a professional body of heat treaters. It has since evolved as an international professional body of material scientists, engineers, R&D professionals and academicians with the motto of collecting & disseminating knowledge on Materials and Processes. The worldwide network of more than 38,000 individuals is led by members, guided by members' needs and fueled by members' participation.

About ASM Bangalore Chapter

ASM Bangalore chapter is actively involved in dissemination of materials centric knowledge among working professionals, researches and academicians. ASM Bangalore chapter began its activities in the year 2006. Since then it has dedicated itself in spreading information based on materials among various stakeholders. Bangalore is a strategic center for several major automotive, aerospace, defense & R&D institutes and thousands of engineering professionals and it is imperative to educate & connecting the community in the field of Metals & Material science Technology. Under the able leadership of present chairman Mr. Rahul Masurekar – a well-known Industrialist and capable office bearers, ASM Bangalore chapter is gaining wide popularity by activity involving and supporting the technological up-gradation of Engineering community.

The Prime Objectives of ASM Bangalore Chapter:

1. To disseminate materials centric information among professionals by organizing seminars, lectures, One/two days' workshops
2. To bring together Scientists, Intellectuals and Professionals working in the field of materials science to exchange ideas/knowledge/information.
3. To encourage and support student chapters among various Engineering colleges in the state of Karnataka and enlighten them, the importance of materials properties, selection and its application.
4. To Promote consultancy services by ASM members to solve industry problems in the area of materials.
5. To recognize and award ASM members for their contributions to field of materials science.

ASM Bangalore chapter has members with rich expertise and professional experience with deep insight to practical applications in the field of materials science & engineering. ASM Bangalore chapter offers consultancy in the broad areas of Material selection & Characterization, foundry practices, mechanical testing, forging, heat-treatment, failure analysis, Corrosion control, Nondestructive Evaluation (NDE), process simulation to name a few.

ASM Membership

A membership in ASM gives you every imaginable edge you seek in your career.

VISIT - <http://www.asmlrchapter.com/membership.php> - for Benefits and Forms

Or Call Membership Chair – Mr. Krishnadas Nair – 8879233440

Or write ASM Bangalore Chapter asmlr2015@gmail.com

Featured Articles:

“Intech Additive Solutions: Reinventing Additive Manufacturing”

Intech Additive Solutions, a leading solutions provider in Metal Additive Manufacturing (AM) systems and AM Software, is the first Indian Original Equipment Manufacturer (OEM) to develop and supply Metal 3D Printers based on the Laser Powder Bed Fusion (LPBF) technology. The “first Metal 3D Printing service bureau” in the country, Intech Additive Solutions, was established in 2012 by Sridhar Balaram, the Founder, CEO & MD.

Metal 3D Printing, a subset of Additive Manufacturing (AM), is a technology that produces fully functional rapid metal prototypes and three-dimensional end-use production parts from a wide array of metals. The LPBF process begins with creating a 3D CAD model, which is then “sliced” into several discrete layers. A heat source, typically lasers, partially melts the powdered metal base for each layer, which binds together with subsequent layers to form three-dimensional objects.

The flexible design process, especially for complex geometries, and print-on-demand capabilities, render AM a much more feasible option than the conventional manufacturing methods.

In LPBF systems, optimizing the following process parameters is vital to print parts of the required density and other mechanical properties.

- Laser Power
- Scan Speed
- Hatch Spacing
- Layer Thickness

Typically, the optimization of the parameters involves the Design of Experiments (DOE) in multiple iterations. As the time required for this, including testing, is about eight months, the cost of the entire process also increases manifold.

To save both cost and time resources, Intech Additive Solutions designed and developed a parameter optimization software – **AMOptoMet**. First launched in 2017, it is a first-of-its-kind new alloy parameter development software. With AMOptoMet, Twin Laser productivity can be achieved with a Single Laser Machine.

AMOptoMet is a software suite for optimization, tuned for calculating and optimizing the process parameters of a given alloy for the Laser Powder Bed Fusion (LPBF) technology. AMOptoMet simplifies the AM environment and reduces the print process workloads.

Once the required Particle Size Distribution (PSD) details are logged in for evaluation, the following features provided by AMOptoMet can be accessed:

- Parameter Prediction
- Image Analysis
- Powder Distribution Evaluation
- Design of Experiments (DOE)

AMOptoMet, predicts the ideal print parameters to achieve higher productivity and better surface finish. AMOptoMet offers its users the following benefits:

- Increase in Build Rate up to 50% and more
- Reduction of Printing-hours upwards of 35%
- Development of New Alloys in < 50% of the usual time
- Suitable with any Metal Powder supplier
- ROI in 6 months or less of printing
- Parameter adjustments for different thickness layers

CASE STUDY – AMOptoMet for Improved Surface Finish

AMOptoMet was employed during the Metal 3D Print process.
Application: Medical, Part: Stethoscope, Material: AlSi10Mg



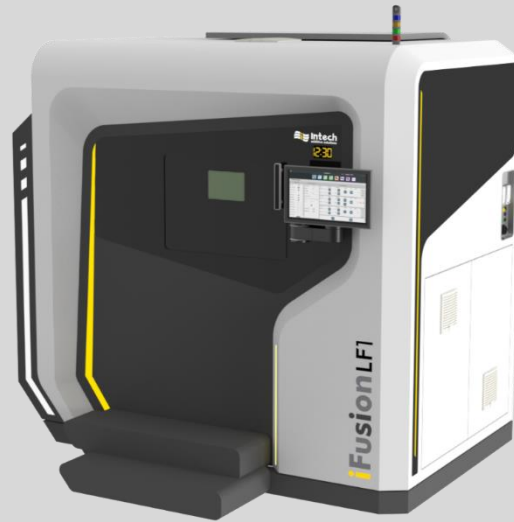
RESULT:

- Reduced Post-Processing by achieving better surface finish through AMOptoMet
- Faster Printing and Reduced Machine Hour Rate (MHR)
- Machine hours were reduced by 30%
- Manufacturing cost was reduced by about 35%
- Build Rate was increased by about 60%
- Quicker ROI in 5 to 6 months

In addition to AMOptoMet, Intech has also indigenously designed and developed iFusion LF and SF series of printers, which has the capacity to manufacture small to large metal parts for multiple industrial applications printers and software.



iFusion SF1



iFusion LF1

AMBuilder, Intech's build processing software, comes with an intuitive workflow and a host of intelligent features, some of which are the optimal orientation of parts, support generation, and path generation.

Intech's indigenously designed and developed software, AMOptoMet and AMBuilder, employed in tandem with its iFusion printers, make it possible to achieve the "first-time-right" print of parts.

About Intech Additive Solutions:

Intech Additive Solutions Pvt. Ltd is the first Indian Original Equipment Manufacturer (OEM) to develop and supply Metal 3D Printers based on Laser Powder Bed Fusion (LPBF) technology. Intech Additive is a complete solutions provider in Metal Additive Manufacturing (AM) systems and AM Software. Intech's Metal 3D Printers, with its software suite, provide customers with a ready-to-print AM solution out-of-the-box coupled with local after-sales services. Intech Additive Solutions is a TUV Certified ISO 9001:2015 & AS 9100D company.



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“Superalloys for aircraft turbine engines”

Dr. S. K. Makineni
Assistant Professor, Department of Materials Engineering,
Indian Institute of Science Bangalore - 560012, India



Turbine engines are one of the most complex engineering parts of a propulsion system that drives aircraft to high altitudes and long distances. During the last semicentennial, the volume of air traffic has grown significantly, be either through commercial passenger mobility that facilitates trade, health care, jobs, etc., or defense transportation. These have a tremendous impact on the socio-economic development and sustainability of a country. The aviation sector represents 3.5% of the gross domestic product worldwide, and it is estimated that the demand for air transport will increase by 4.3% per annum over the next 20 years [1]. Hence, the main priorities for future propulsion systems include low emissions and fuel efficiency without compromising on safety. These demands can be fulfilled by robust and efficient engine design, discovery, and use of new stronger materials with high melting points, high-temperature environmental resistance, low mass density, and excellent durability.

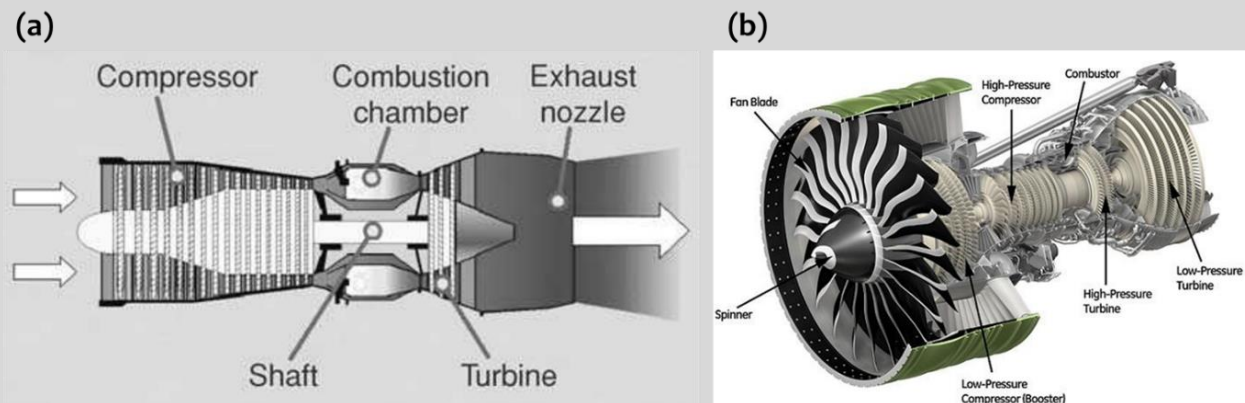


Figure 1: (a) A schematic of a basic turbine engine (adapted from reference [2]). (b) A 3D view of a turbine engine (adapted from a press release [3])

A typical turbine engine comprises sections that are a fan, compressor, combustor, and turbine, as shown in figure 1. The working principle is based on the Brayton cycle. First, the air is sucked through the fan, compressed, and mixed with fuel, burned in a combustor that results in a high-pressure hot gas that is allowed to expand across the turbine and blast out at a very high speed through a nozzle at the back of the engine. This leads the engine and aircraft to thrust forward. Depending on the sections, the operation temperature also varies significantly from 100°C at the front to as high as 1500°C at the entry of the turbine section. The temperature dictates the type of material to be used for the respective section components. Titanium-based alloys are best suited for fans, blades, and disks in compressors where temperatures rise to 700°C. Ni-based and Co-based wrought superalloys are used in the combustor, while in the turbine section where the gas temperature goes up to 1500°C, Ni-base single crystal

superalloys coated with oxidation-resistant bond coat and a yttria-stabilized zirconia top coat as a thermal barrier are used for the blades. These experience a severe combination of load, temperature, and highly corrosive gaseous environment. The blades are attached to disks made of Ni-base polycrystalline superalloys. At the end stage of the turbine section, the components are cast Ni-base polycrystalline superalloys where the temperature goes down to $\sim 800^{\circ}\text{C}$. The disks are held on the shafts made of high-strength steels or Ni-base superalloys that require excellent high strength and fatigue properties.

The research effort towards increasing the high-temperature capability of the components used in the turbine section is always a strong focus since the efficiency of an engine scales up with the operating temperature. One breakthrough happened in the process development, i.e., to grow single-crystal turbine blades of Ni-based superalloys devoid of grain boundaries, figure 2(a). Subsequently, multiple generations of Ni-base superalloys were developed to improve properties and capabilities to withstand higher temperatures. The developments were on selecting alloying additions and optimizing heat treatments to obtain desired volume fraction and size distribution of strengthening Ni_3Al coherent precipitates (γ') embedded in soft Ni solid solution face-centered cubic matrix (γ) as shown in figure 2(b-c). Typical commercial superalloys are composed of 8 to 10 major alloying elements, each having a definite purpose. For example, CMSX-4 is a 2nd generation alloy in service and has a composition 61Ni-9.3Co-6.2Cr-5.7Al-6.9Ta-6.3W-1Ti-0.6Mo-0.1Hf-2.9Re (wt.%). A more recent development is TMS-238, a 6th generation alloy that is not in service has a composition 57.8Ni-6.5Co-4.6Cr-5.9Al-7.6Ta-5W-1.1Mo-0.1Hf-6.4Re-5Ru (wt.%). As we see, the newer generation alloys consist of less abundant elements such as Re, Ru, Ta, and W, responsible for high-temperature strength and stability and contain up to 20 to 24 wt.% of the total alloying elements. Hence, the present motivation and challenge are to develop new compositions containing low amounts of these less abundant elements without compromising the high-temperature properties. Recently, several material discoveries as emerging materials have happened as a search for alternatives to Ni-base superalloys with higher temperature capabilities and better environmental resistance.

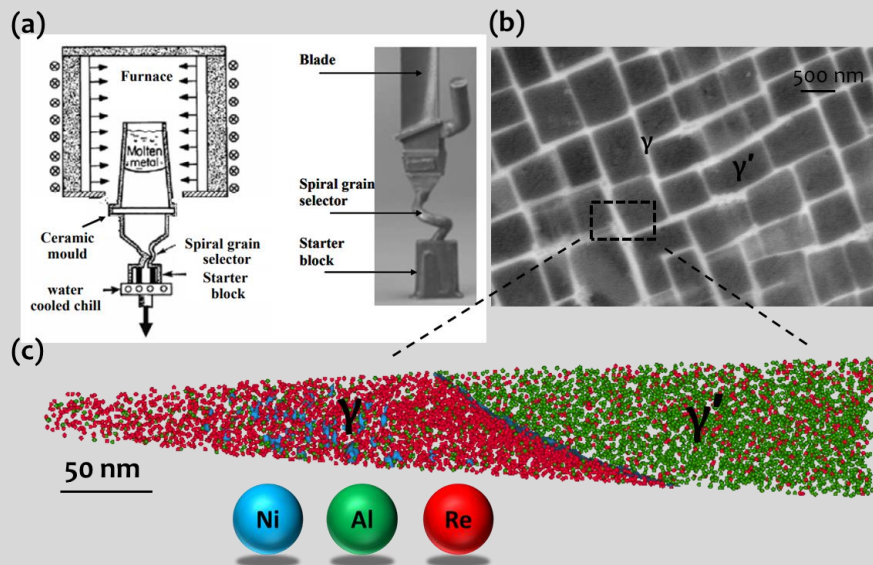


Figure 2: (a) A Schematic drawing of investment casting for single crystal turbine blade and a single crystal turbine blade with spiral grain selector (adapted from reference [7]). (b) A backscattered scanning electron micrograph of a single crystal Ni-based CMSX4 superalloy. (c) An atom probe tomogram showing compositional partitioning across γ and γ' phases.

For example, with a similar γ/γ' microstructure, Co-based superalloys were identified with potential benefit compared to Ni-based superalloys due to their higher solidus and liquidus temperatures (by 100°C to 150°C) [4,5]. In the same thought, Nb and Mo-based refractory alloys (Nb-Si-Ti and Mo-Si-B based) are shown to be promising for ultra-high temperature applications due to their extraordinary environmental resistance at 1300°C [6]. However, a significant challenge is their processing due to their high melting points. The Ni-base single crystal superalloys currently in service are employed in rotating engine components where they tolerate temperatures go up to 1200°C, which is 90% of the onset temperature of alloy melting. The blades are sequentially coated first with bond coats and ceramic TBCs (thermal barrier coatings) to increase the gas temperatures further [8]. The role of bond coats is to mitigate the difference in thermal properties between the metallic blade and the ceramic coatings. The bond coats typically contain high Al that additionally provides resistance against oxygen diffusion at high temperatures by forming a protective Al₂O₃ layer. Hence, the mechanical strength of these bond coats is very crucial and is one of the major areas where research is in progress.

In addition to the alloy composition, the mechanical, aero, and thermal design of the blades and other components are critical. With the improvement in engine performance, the complexity of the component design also has increased. Hence, in the last two decades, significant advances have been made in developing additive manufacturing methods for building metallics engine components of intricate and geometrically complex shapes [9]. These methods include powder-bed (electron beam melting, selective laser melting, direct metal deposition) and powder-feed processes (wire feed deposition, laser engineering net shaping, etc.). Applying these additive methods reduces the number of parts to be assembled for a component and the weight. Presently, the application is restricted to non-rotating engine components—one of the major challenges in obtaining defect-free and homogenous metallic components by optimizing the additive process parameters.

In conclusion, the development of metallic alloys with good mechanical and thermophysical properties will always be a crucial target for material scientists since these alloys will remain the primary material for engine components and advanced propulsion systems. Additionally, demand for innovations in processing strategies such as additive methods of these materials will continue.

References

- [1] Future of Aviation, (n.d.).
<https://www.icao.int/Meetings/FutureOfAviation/Pages/default.aspx> (accessed September 11, 2021).
- [2] R.C. Reed, *The superalloys: fundamentals and applications*, Cambridge university press, 2008.
- [3] B.I. Reports, *Latest Trending Report on Aircraft Turbofan Engine Market*, (2020).
<https://www.openpr.com/news/2084823/latest-trending-report-on-aircraft-turbofan-engine-market> (accessed September 11, 2021).
- [4] A. Suzuki, H. Inui, T.M. Pollock, L12-Strengthened Cobalt-Base Superalloys, *Annual Review of Materials Research*. 45 (2015) 345–368.
- [5] S.K. Makineni, M.P. Singh, K. Chattopadhyay, Low-Density, High-Temperature Co Base Superalloys, *Annual Review of Materials Research*. 51 (2021) 187–208.

- [6] J.H. Perepezko, The Hotter the Engine, the Better, *Science*. 326 (2009) 1068–1069.
- [7] H.J. Dai, J.C. Gebelin, M. Newell, R.C. Reed, N. D'Souza, P.D. Brown, H.B. Dong, Grain selection during solidification in spiral grain selector, *Superalloys*. 2008 (2008) 367–374.
- [8] N.P. Padture, M. Gell, E.H. Jordan, Thermal Barrier Coatings for Gas-Turbine Engine Applications, *Science*. 296 (2002) 280–284.
- [9] Y.T. Tang, C. Panwisawas, J.N. Ghousoub, Y. Gong, J.W.G. Clark, A.A.N. Németh, D.G. McCartney, R.C. Reed, Alloys-by-design: Application to new superalloys for additive manufacturing, *Acta Materialia*. 202 (2021) 417–436.

Authors Information

Dr. Surendra Kumar Makineni is an Assistant Professor at the Department of Materials Engineering Indian Institute of Science. He is an accomplished researcher with an industrial outlook with over 55 articles in peer-reviewed journals and 3 patents to his name. He completed his B.Tech. from NIT Rourkela and PhD from IISc Bangalore. Before moving back to his alma mater as a professor he spent his time at Max-Planck-Institute for Iron Research Dusseldorf, Germany as a post-doctoral researcher where he was selected for the esteemed Alexander von Humboldt Fellowship. He is currently heading the Alloy Design, Deformation, and Degradation (A3D) Group at IISc and also as a group head for the MPG-IISc Partner group (2021-2026). The group work on a range of materials for engineering applications such as aerospace, automobiles, etc. They manipulate structures at the atomic-scale by elemental additions to design new materials with improved properties. The main areas are Superalloys (Co- and Ni-based), Light Metal Alloys (Al- and Mg-based), and other engineering alloys such as Cu-based, High entropy alloys, etc. Additionally, with advanced microscopy characterization methods, they correlate the effect of local structure and compositional changes directly to the material strength and creep properties.

Calendar of Events

Special Events & Highlights

On behalf of ASM (I) Bangalore chapter and Mechanical Department of RV College of Engineering, the Inaugural function of RVCE Material Advantage Students Chapter was organized on 23.06.2021.

Date / Venue	June 23, 2021 @ CISCO WEBEX Platform
Speaker / Programme	Mr. V. Babu Sathian, Vice Chairman of ASM INC and Mr. Rahul Masurekar, Chairman of Bangalore chapter, graced the function as Chief Guests.



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RVCE STUDENT CHAPTER

DATE: 23/06/2021 WEDNESDAY, AT 9:50AM ONWARDS
MEETING LINK: <https://rvce.webex.com/rvce/j.php?MTID=m2decda9ea5da58fc795c8902dca06bb9>


MR. RAHUL MAUSREKAR
Chief Guest


MR. V BABU SATHIAN
Guest of Honor


DR. K N SUBRAMANYA
Principal, RV College of Engineering

PROGRAM AGENDA

Welcome address	Dr. M. Krishna <small>HOD, Dept of Mechanical Engineering</small>
Chief Guest	Mr. Rahul Masurekar <small>Chairman, ASM(I) Bangalore chapter</small>
Guest of Honor	Mr. V Babu Sathian <small>Vice Chairman, ASM India National Council</small>
Principal address	Dr. K N Subramanya <small>Principal RV College of Engineering</small>
Unveiling of Office bearers	Dr. Nataraj J R <small>Associate Professor ME Dept.</small>
Unveiling of program for the next 3 to 6 months	Prof. Ramesh S Sharma <small>Professor ME Dept.</small>
Vote of thanks	Prof. H D Gopalakrishna <small>Associate Dean ME Dept.</small>

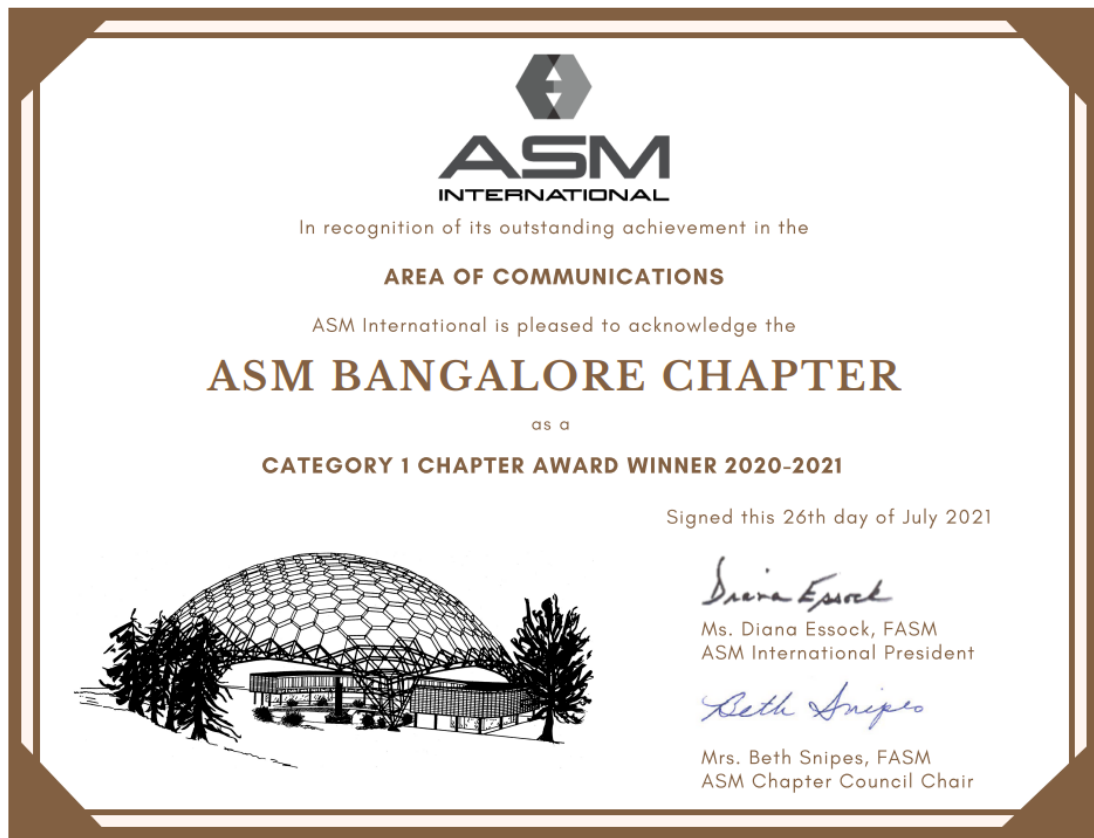

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" Training on Failure Analysis "

Date / Venue	During the period – 30 th June 2021 to 26 th July 2021 @ Ring Central Online Meeting Platform
Speaker / Programme	Dr. Nataraj and Mr. Ajith Kumar Sandur from ASM (I) Bangalore Chapter organised the online training course on Failure Analysis for the employees of M/s. AISIN AUTMOTIVE HARYANA PVT. LTD, Bangalore.

FEATHER IN THE CAP

Bangalore Chapter are Winners 2020-2021 ASM INTERNATIONAL AWARDS in the “Area of Communications” for the second consecutive year. The Award includes the prize money of \$500.



RV College of Engineering - Material Advantage Charter (Certificate) is being presented to Principal (Fig a) RV College of Engineering and HoD (Fig b), Mechanical Engg. Department



Fig. a



Fig. b

Technical Lecture / Talks

"Thin and Thick Film Coatings and Additive Manufacturing applications in Aerospace industry"

Date / Venue	May 8, 2021 @ Ring Central Online Meeting Platform
Speaker / Programme	Dr. Satish Dixit, Physics and Materials Science Director of Engineering/R&D at Plasma Technology Inc., (PTI), USA



"Metal Powders for Additive Manufacturing"

This talk was organised by ASM International Bangalore and Pune Chapters

Date / Venue	May 21, 2021 @ Ring Central Online Meeting Platform
Speaker / Programme	Dr. Ing. Priyanshu Bajaj, Regional Manager, Asia Pacific for m4p material solutions GmbH, Austria and Germany.



“Advanced Coatings in Gas Turbine Engine Applications”

Date / Venue

June 4, 2021 @ MS Teams Online Meeting

Speaker / Programme

This Seminar organized by ASM International Bangalore chapter and Indian Institute of Metals, Bangalore Chapter

SPEAKERS



Prof. Shrikant Joshi
University West, Sweden.



Dr. Zhiqian Zhang
IMRE, Singapore.



Dr. Zhang Zhiqian
IHPC, A Star group, Singapore.



Prof. Sanjay Sampath
Stony Brook University, New York, USA.



Dr. Zafir Alam
Scientist, DMRL, India.



Prof. Carlos Levi
Uni of California Santa Barbara, USA.



Dr. Dheepa Srinivasan
Pratt & Whitney R&D Center, India.

LIGHT WEIGHTING APPROACHES: - A Materials perspective

Date / Venue

June 26, 2021 @ Ring Central Online Meeting Platform

Speaker / Programme


Mr. Ajit Kumar Sandur, Consultant, R&D, TVS Motor Company Limited, Bangalore and ASM Bangalore chapter member




Chemical and Physical Modulation of Respiratory Droplets

- **First Online Technical Talk organized by "RVCE Materials Advantage Student Chapter**

Date / Venue	July 12, 2021 @ Cisco webEx Meeting
Speaker / Programme	Dr. Jiaxing Huang, Department of Materials Science and Engineering, Northwestern University of Illinois, USA



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Material Advantage RV College of Engineering
Student Chapter
Cordially Invites you to Maiden Online Technical
Talk on

**Chemical and Physical Modulation of
Respiratory Droplets**

By



Dr Jiaxing Huang
Department of Materials Science
and Engineering, Northwestern
University, Illinois, United States

Date & Time: Monday, July 12, 2021 at 6:00pm IST onwards
On-Line Technical Talk on: Ciscowebex Platform
Link: <https://bit.ly/3wqgggU>
Registration Link: <https://forms.gle/whjfCDqgMhnFNBC7A>

**Dr K N Subramanya, Principal, RV College of Engineering, has graciously
agreed to chair the session**

Faculty Advisors:

Dr Ramesh S Sharma
Faculty Coordinator

Dr Nataraj J R
Secretary,
ASM Bangalore Chapter

Technical Chair: Vandan Dubal
Contact: +91-9426247342 vandandubal.mmd20@rvce.edu.in

“FLASH-CARBIDE” – An Alternative to Electroplated Hard Chrome

Date / Venue	July 17, 2021 @ Ring Central Online Meeting Platform
Speaker / Programme	Mr. P. T. Bindagi, Managing Director, Spraymet Surface Technologies Pvt Ltd, Peenya Industrial Area, Peenya, Bangalore



“THE ALTERNATIVE BOARD – A Transforming Intervention in Managing an SME”

Date / Venue	July 31, 2021 @ Ring Central Online Meeting Platform
Speaker / Programme	Mr. Rahul Masurekar, Managing Partner - ACE Carbonitriders, A-145, 3rd Cross, 1st Stage, Peenya Industrial Area, Bangalore



Testimonial from Mr. Rahul Masurekar:

As a member of ASM (I) Bengaluru Chapter for more than 10 years now I can count the following as personal gains from my participation:

- 1) Satisfaction of serving the community of technocrats without expectations of any tangible gains.
- 2) Authentic Relationships with people in similar professions with no agenda for personal gain. These relationships provide valuable help especially technical, often with little or no cost.
- 3) Constant stream of knowledge sessions with both contemporary and conventional technologiesagain at no cost.
- 4) Engaging in teamwork with hi calibre professionals in the domain of my profession, that too from different parts of the country and the world, all of them with the single purpose of serving the community of material science professionals.
- 5) Opportunity to contribute to the next generation by virtue of the chapter's engagement with students.

.....and the list could go on.

Needless to say that this was the result of whole hearted participation without any agenda for any tangible gains.

Events Calendar 2020 - 2021

1. Memberships	Drive by Headquarter / India Task Force
2. Monthly Technical Talks	To improve consistency and Participation
3. Student Outreach	<ol style="list-style-type: none"> a) Events for Students – Talks + Industrial Visits b) Membership & Student Chapter Formation c) Support in Projects / Training d) Material Camps
4. Major Events	<ol style="list-style-type: none"> a) One/Two Days Workshops / Seminars b) Annual Get-together c) Annual General Body Meeting d) Hosting of INC Meeting / Visiting ASM Leaders e) Support to other ASM Chapters / Local Associations in their events.
5. Technical Talk	Every 2 nd & 4 th Saturday 5.00 pm if Webinar or Every 3 rd Saturday 5.00 pm
6. Executive Council Meetings	This Qtr. – May 15, 2021 ; June 19, 2021 ; July 17, 2021

ASM International Bengaluru Chapter cordially welcomes the following New Members who have joined during the period – From 1st May 2021 to 31st July 2021:

Sl. No.	Names of New Members
1	Dr. C. M. Ramesha, M S Ramaiah Institute of Technology
2	Dr. Surya Sarathi Bose, Materials Engg., IISc
3	Mr. Jayakrishnan C., Adpro Systems India Pvt. Ltd.
4	RVCE Material Advantage Student Chapter Members
1	Prof. Ramesh S. Sharma (Faculty Advisor)
2	H. Abhishek
3	A. Akshay - Chairman
4	Amith Lawrence
5	Bhimanagouda S Patil
6	G. Lohit
7	R. N. Hariharan
8	Savant Harish Bhimrao
9	Akshati Harsha S.
10	Takale Indrajeet Ravindra
11	Govindan Jaisurya - Treasurer
12	Naveen R G- Vice Chairman
13	Hampi Prasad
14	Biradar Sagar B.
15	Patil Shrenik Mahavir
16	Harithsa Shreyas Nandakumar- Secretary
17	Kudari Suvan S.
18	Dubal Vandan
19	Vinaykumar
20	Kanekal Vineeth
21	Y. Saipranavateja
22	T. S. Yeshwanth Kumar
23	Asha S.

ASM International -Bangalore Chapter

Visit www.asmlrchapter.com for more details about ASM Bangalore chapter and membership

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Please mail your valuable suggestions/comments to: asmlr2015@gmail.com