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Vice Chairman

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Balasubramanian
Gen. Secretary

Mr. P. T. Bindagi
Treasurer

Mr. Rahul Masurekar
Immediate Past Chairman

Dr. Priyanshu Bajaj
Editor, News Letter

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Chairperson's Message



Dear Readers,

Although I am always “ASM proud,” the past few months have given me an elevated sense of appreciation for all things at our Bangalore Chapter.

Productive hybrid committee and independent meetings every month highlighted the dedication of our members to continuously driving standards forward.

Successful meetings with members from India National Council and ASM Head Quarters showcased the commitment of our governance and reinforced our direction moving forward. Further our chapter was awarded in three categories by ASM Head Quarters, which recognized our achievements in the areas of Innovative Programming, Student Outreach and Communication.

ASM Bangalore Chapter in association with ‘Indian Plastic Institute’, Bangalore Chapter organized ‘Plastic Clinic 2022’. In spite of this event being the first of its kind for Bangalore Chapter the response was overwhelming and we were requested to organize more such clinics modeled on similar concepts, by the participants. Together, these along with many more events have all reinforced to me the impact of our members and governance on both our chapter and our mission.

I eagerly look forward to have suggestions and ideas from fellow members to increase the activities of our Chapter. I have no doubt that with your support and active participation, our Chapter will continue to climb ladders of excellence and make the Chapter more industry oriented.

I hope you're as ASM proud as I am.

Jyothi Sriram

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, researchers 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 chairperson Mrs. Jyothi Sriram 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. Manohar Hegde – 9901964251 / Mr. K. L. Srirama - 9845699661

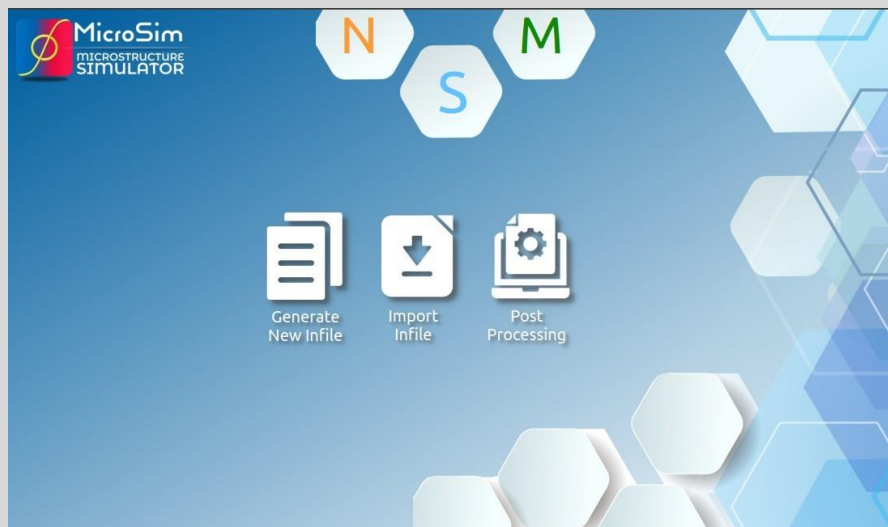
Or write ASM Bangalore Chapter : asmlr2015@gmail.com

Featured Articles:

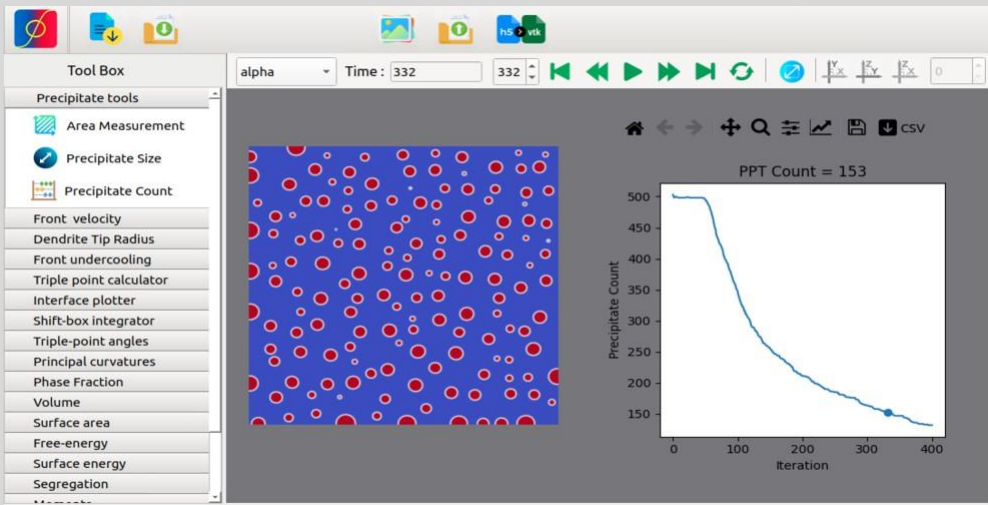
MicroSim: An Indigeneous phase-field solver for microstructural simulations

Dasari Mohan, Tanmay Dutta, Ajay Sagar, Saurav Shenoy, Nasir Attar, Abhishek Kalohe, Venkatesh Shenoi, Ankosh Deshmukh, Abhishek Kumbhar, Swapnil Bhure, Vaishali Shah, M.P. Gururajan, Saswata Bhattacharya, Gandham Phanikumar, Abhik N. Choudhury

Modeling of microstructural evolution has become an important paradigm for achieving the goals of Integrated Computational Materials Engineering (ICME). Microstructural evolution during typical phase transformations like solidification, precipitation, grain-growth and recrystallization are mesoscopic in scale. However, the simulation softwares available for these simulations are fairly limited. In fact, most of those softwares are not open-source, which would allow the users to modify the source-codes according to their requirements, as well as limited by the hardwares on which the simulations can be executed or their lack of flexibility in the usage of mathematical models. That led us to develop an open-source software MicroSim (Microstructural Simulator) containing solvers using the phase-field method for simulating mesoscopic phenomena in materials. The solvers in MicroSim are capable of utilizing both CPUs (through MPI) and GPUs (through CUDA or OpenCL), contrary to the available alternative softwares and thus considerably faster. Also, the solvers have different discretization strategies (finite difference, finite volume and Fast Fourier transform) with different models. All solvers have the possibilities for incorporating thermodynamic information either from databases using the pycalphad interface or by extracting from commercial databases. It is also possible to have user defined functions (free energy, anisotropy etc). A graphical user interface has been developed for generating input files for simulations, running the solvers and post-processing. The salient features of the solvers are described in the following, along with their possible future updates.

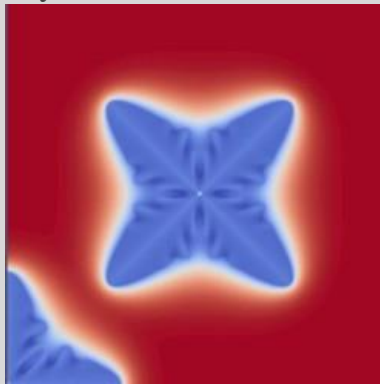


Graphical user interface for generating input to the simulations



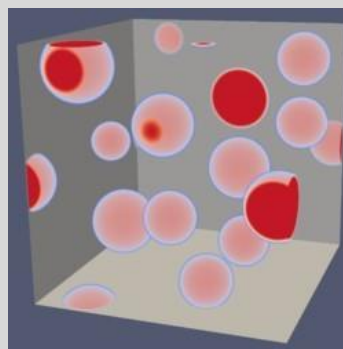
Post-processing tools for analyzing the results from generated output

Grand-potential based solver: This is a multi-phase multi- component phase-field solver based on a regular-grid finite- difference discretization, with a simple Euler forward time marching scheme. It is based on the phase-field model presented in Phys. Rev. E 85, 021602 (2012). The solver is parallelized using a simple block domain-decomposition using MPI. There is also a serial version of the solver available for quick computations using a CPU. Presently, these solvers are discretized in 2D and future releases will contain more features as well as domain discretization in 3D. A dedicated module related to its usage can be found in the repository.



Solidification simulation using Grand-potential based solver, showing dendrite formation at different angles

Kim Kim Suzuki (KKS) based model (OpenCL): This is a multi-component based solver that is based on the Kim Kim Suzuki model which uses a finite difference discretization with explicit time stepping. The code utilizes the OpenCL based framework for utilizing both CPU and GPU infrastructure. The solver allows for parsing in a .tdb file for reading in the thermodynamic information directly into the phase-field formulation. Presently the code has been implemented for 2D and future releases will contain more features as well as the more generic 3D solver. A dedicated module related to its usage can be found in the repository.



Coarsening simulation using KKS CuFFT solver

Kim Kim Suzuki model and utilizes the Fourier transform for the solution of PDEs by leveraging the CuFFT libraries as part of CUDA. The solver is meant for utilizing the NVIDIA GPU graphic cards particularly the Tesla-P100 and later cards. Because of the Fourier transform discretization this solver module has by default periodic boundary conditions. The code can be utilized for both 2D and 3D geometries and is presently written for utilizing single GPU cards. Later versions of the code will be extended for parallelization on multiple GPUs. A dedicated module related to its usage can be found in the repository.

Cahn-Hilliard model (FFTW): This is a binary alloy solver that is based on the Cahn- Hilliard formulation and utilizes the Fourier transform based solution of PDEs by leveraging the FFTW3 libraries. The solver runs on single CPUs and it is meant for quick solutions to problems in smaller domains. Because of the Fourier transform discretization this solver module has by default periodic boundary conditions. The present solver is programmed for 2D domains that will be generalized for 3D domains in future releases. Along with this, the solver will also be extended for simulating multicomponent and multi-phase systems. A dedicated module related to its usage can be found in the repository.

OpenFOAM based solvers: Along with the preceding softwares that are a result of home-grown codes that have been integrated over the years, the software stack will also contain the implicit finite volume based modules that are utilize the OpenFOAM multiphysics platform. The modules that will be shared as part of this software stack will contain an independent documentation of the module and its usage. Presently, there are single-phase binary and ternary alloy solidification, grain-growth and precipitation modules which are based on the Grand-potential based formulation. Future release will contain modules for two-phase alloys. Since the modules utilize the OpenFOAM framework, they are generic solvers for both 2D and 3D domains.



Multigrain simulation of AlZn alloy using OpenFOAMsolver.

AMReX based solvers: In the next release, we plan to add implicit finite difference codes for modeling solidification and precipitation of multi-phase multi-component alloys using linear algebra libraries (AMReX) and block multi-grid solvers parallelizable on CPUs and GPUs.

Future updates of the softwares will introduce solvers that incorporate elasticity, extensions for three-dimensional simulations as well as modules for grain-growth and recrystallization. For relevant updates the reader is recommended to check the repository, <https://github.com/ICME-India/MicroSim>. In conclusion, MicroSim is the first indigeneous phase-field software in the country and is an important step in the direction towards making India self-reliant in software development for Microstructure simulations. In particular, given its open-source nature, it promises to synergize

Brief Biodata of the Author

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Identification Information

- Birth Place: Kolkata, India
- Birth Date: 4th Nov 1984
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- Permanent address: 6M/225, 6th Main 2nd Main, H.R.B.R. Layout Kalyannagar, Bangalore 560043, Karnataka, India
- Phone: +918022932683 (Office), +91 805459563 (Residential)
- Email: abhiknc@gmail.com, abhiknc@iisc.ac.in

Education

- **Karlsruhe Institute of Technology(KIT)**—Karlsruhe
PhD. from the Faculty of Mechanical engineering at KIT
 - Finished with the title of Dr.-Ing (Doktors der Ingenieurwissenschaften) with "distinction" (Sep2008-February2012)
 - Under supervision of Prof.Dr.rer.nat. Britta Nestler(KIT-IAM-ZBS) and Prof.Dr.habil. Mathis Plapp (Ecole Polytechnique)
 - Title "Quantitative phase-field model for phase transformations in multi-component alloys"
- **Indian Institute of Technology Madras**—Adyar, Chennai
Dual Degree-5yr course (Bachelor+Master), Major in Metallurgical and Materials Engineering and Minor in Theoretical Computer Science
 - CGPA: 8.91/10
 - Graduated in July 2008 (July 2003- July 2008)

Awards and recognitions

- 2018; Young metallurgist award for the year 2018, award from the Indian Institute of Metals and Ministry of Steel, Government of India
- 2019; INSA medal for young scientist

Calendar of Events

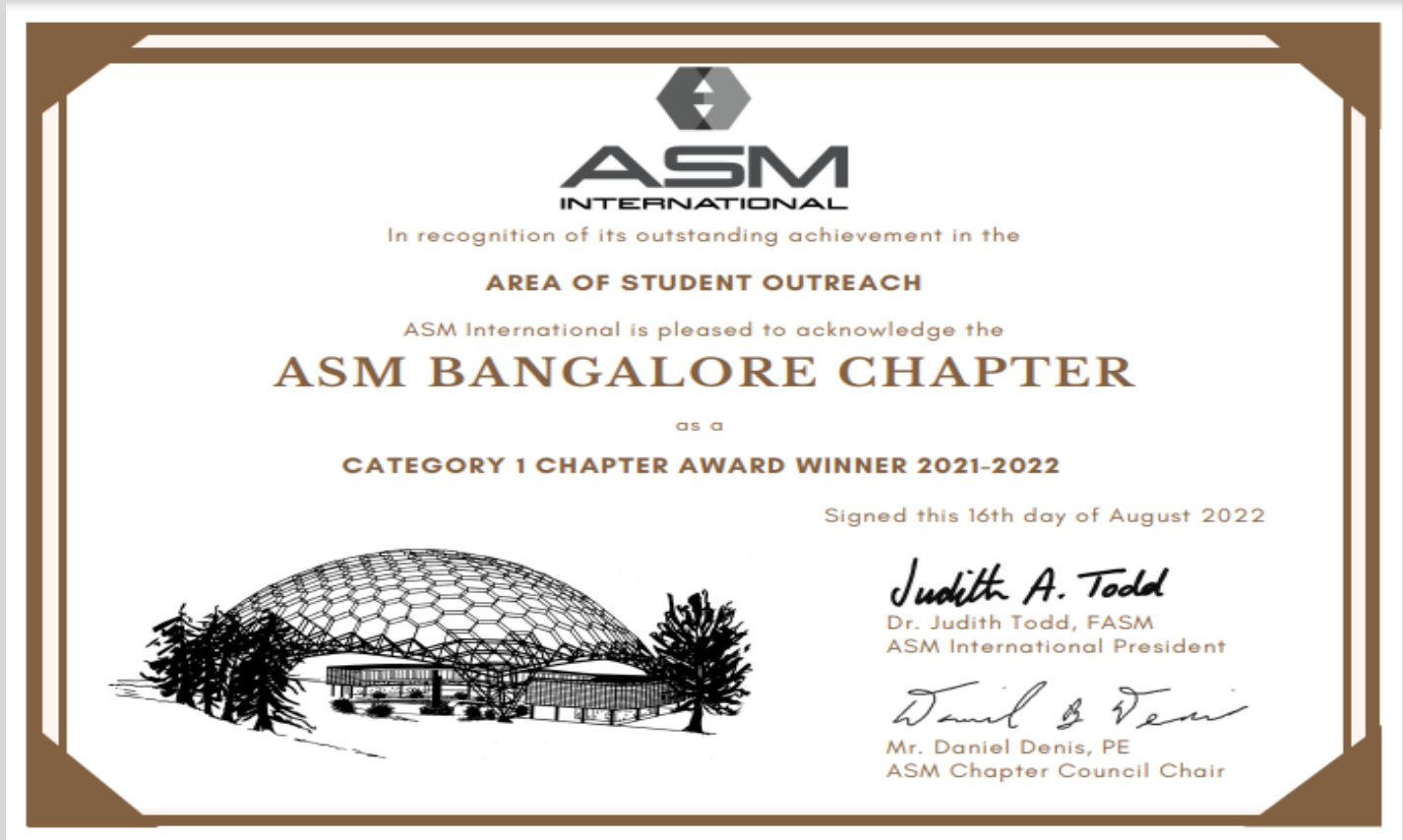
Special Events & Highlights

"Proud & Memorable Moment for the Members of the ASM (I) Bangalore Chapter"

ASM (I) Bangalore Chapter has been selected Winner in the following Categories of Award by the ASM International, ASM World Headquarters, 9639 Kinsman Road, Materials Park, OH 44073-0002. Each award carries a prize of \$500 and we have won total prize money of \$1,500.

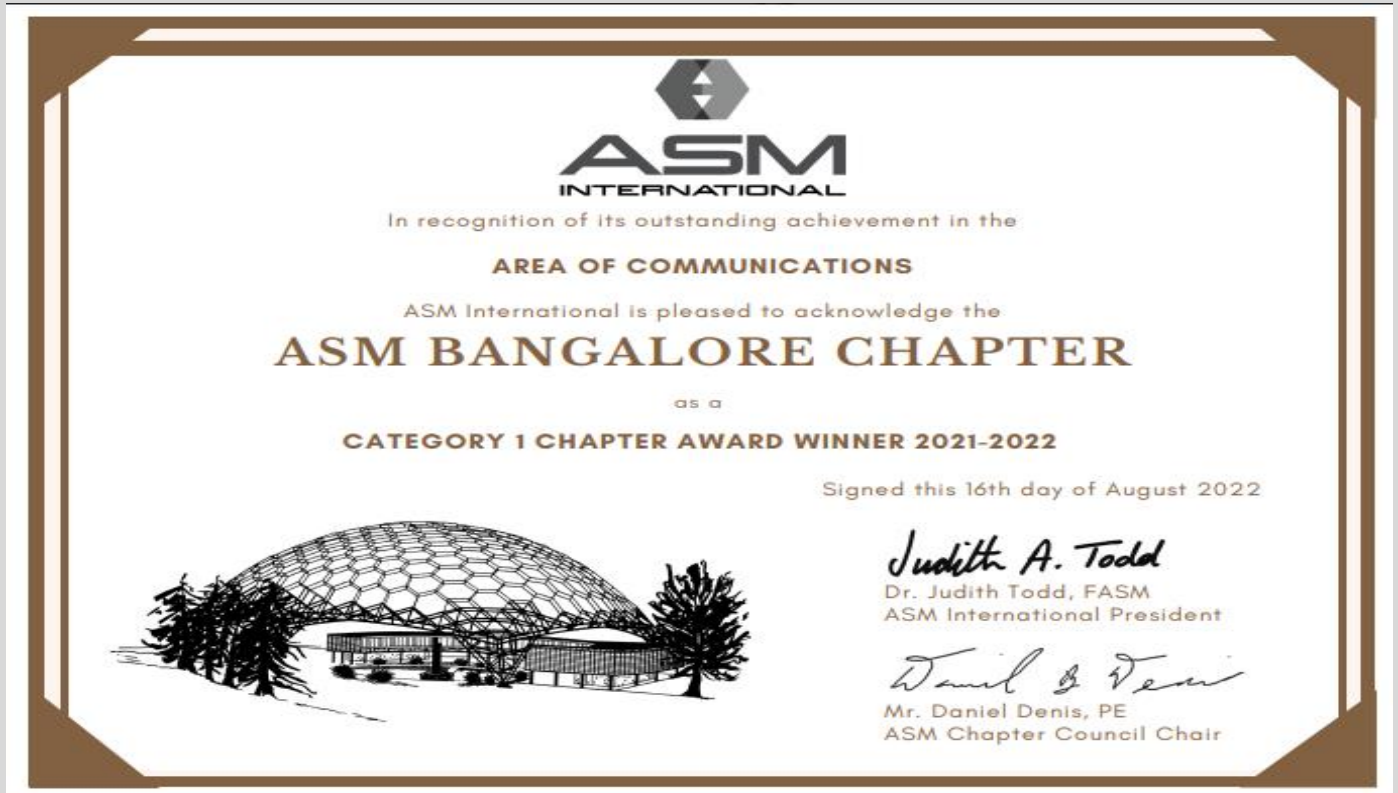
Student Outreach, Size Category 1

Citation: For actively engaging student members and Material Advantage chapters leading to improved growth and retention.



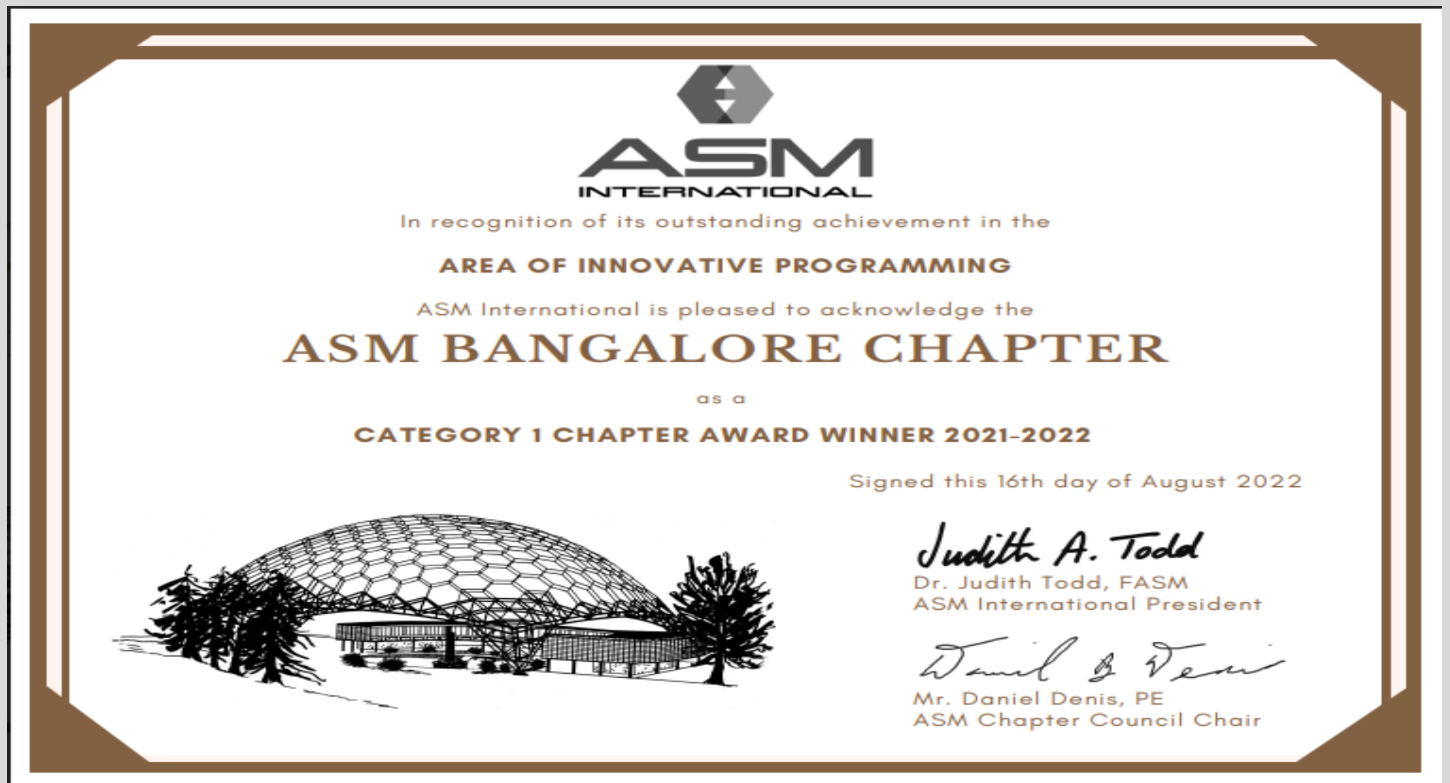
Communications, Size Category 1

Citation: For implementing various strategies and technologies to gain a sound and healthy Chapter with improved growth and retention.



Innovative Programming, Size Category 1

Citation: For executing an innovative education course for a local company with plans to expand to the industry partners.



Technical Talks

ASM International Bangalore Chapter organized an Online Tech Talk on the topic - “Non-Destructive Evaluation of Engineering Materials - Case studies” by Sri P. Vijayaraghavan, Senior Manager (Retd.), HAL, Bangalore.

Date / Venue	July 16, 2022 – Zoom Meeting
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One Day Workshop on Plastic Clinic 2022

ASM International Bangalore Chapter in association with Indian Plastic Institute Bangalore Chapter organised a One Day Workshop on the topic – “Plastic Clinic 2022”.

Date / Venue	September 23, 2022 @ MSME Development Institute, Chord Road, Rajajinagar, Bangalore-560010.
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Traditionally any seminar or workshop will be time bound and have conventional sequence of events like technical lectures and few Q&A sessions.

We conceptualized different approach to attract both industry and academic participants and generate more interest in them. We combined lectures with Expert Panel discussions and display of products from manufacturers. Expert Panel discussions were encouraged to be one-on-one between concerned participants and Experts in the field to discuss their teething / chronic problems in any of the domains - shop floor / design / material selection / processing. All proceedings were kept confidential, as they were all one-on-one in nature in contrast to public Q&A sessions. This concept facilitated participants to discuss their issues without any inhibitions and being assured of confidentiality.

Above concepts were tried out in Plastic Clinic 2022 with collaboration between ASM Bangalore Chapter and IPI (Indian Plastic Institute) Bangalore Chapter. Plastics topic was chosen to expand domain knowledge amongst ASM members and to highlight their importance in Light weighting and EV vehicles.

Highlights of the Clinic were Lectures on plastic materials, CAE simulations and flow simulations of plastic materials, screw life improvements thru Flash carbide coatings etc. followed by Expert panel discussions.

Panel consisted of experts from core plastic industries with rich experience in processing, material selection and troubleshooting. Four industry participants availed benefits from the Panel. There were display of products from different plastic industries.

Overall experience of the Clinic was thrilling, and participants were seen craving for many more such Clinics in future. Both members from ASM and IPI cherished fruits of the event and appreciated concepts of Clinic and future Clinics would be modelled on similar concepts. Below are photos to give you a glimpse of the event.



Fig 1: Inauguration of Plastics Clinic workshop. (From L to R) Mrs. Jyothi Sriram (ASM Bangalore chapter Chairperson), Mr. Vijaykumar (Chairman IPI Bangalore chapter), Mr. Aravamudhan (Program Mentor) and Mr. Ajith kumar Sandur (Workshop Director)



Fig 2: Participants of the workshop



Fig 3: Speakers at the workshop



Fig 4: Mr. Ajith Kumar Sandur workshop Speaker



Fig 5: Mr. V. Babu Sathian Vice Chairman ASM INC, discussing with Exhibitor and Speaker Mr. P. T. Bindagi (From R to L)



Fig 6: Participants discussing with M/s. Resil Chemicals - Exhibitor



Fig 7: Clinic in Progress: Participants discussing their teething problems with experts



Fig 8: Clinic in Progress: Participants discussing their teething problems with experts

Events Calendar 2021-23

1. Memberships	Drive by Headquarter / India Task Force
2. Monthly Technical Talks	To improve consistency and Participation
3. Student Outreach	<ul 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	<ul 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 3 rd Saturday 5.00 pm
6. Executive Council Meetings	This Qtr. – July 16, 2022 ; August 27, 2022 ; September 17, 2022

SUSTAINING MEMBERS OF ASM (I) BANGALORE CHAPTER



Hexagon-MSC Software Corporation



Lakshmi Vacuum Technologies



Spectrum Tool Engineers Pvt Ltd



Air Force Technical College Bangalore

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