Awards/Recognition

IIT Madras Professor Krishnan Balasubramanian Honoured as Fellow of the Indian Academy of Sciences

IIT Madras celebrates the prestigious recognition of **Prof. Krishnan Balasubramanian**, who has been elected as a Fellow of the **Indian Academy of Sciences (IAS)**. This distinguished honour acknowledges his significant contributions to the field of **Non-Destructive Testing (NDT)** and his dedication to scientific advancement.

The IAS Fellowship is reserved for those who have demonstrated groundbreaking research and leadership. Professor Balasubramanian's advancements in NDT technology have influenced global engineering practices, making critical strides in material sciences and quality assurance techniques.

His leadership at the **Centre for Non-Destructive Evaluation (CNDE)** has fostered technological progress while inspiring young scientists and engineers to pursue impactful research. His mentorship and relentless pursuit of excellence have elevated **IIT Madras** as a hub for pioneering innovation.

This honour is a reflection of his lifelong dedication to scientific discovery. The entire **IIT Madras** community extends heartfelt congratulations to Professor Balasubramanian and wishes him continued success in his future endeavours.

IIT Madras Professor Prabhu Rajagopal Honoured as Rashtriya Vigyan Puraskar

We are thrilled to share that **Prof. Prabhu Rajagopal** has been honored with the prestigious **Rashtriya Vigyan Puraskar: Vigyan Yuva Shanti Swarup Bhatnagar Award**. The award was presented by **President Droupadi Murmu** at the Rashtrapati Bhavan as part of the 2024 Rashtriya Vigyan Puraskar ceremony.

This recognition is a testament to **Prof. Prabhu Rajagopal's** outstanding contributions to Technology and Innovation. We are incredibly proud of this remarkable achievement!

Collaborations/ Lab Visits

ZF Group Visits CNDE at IIT Madras to Explore Automotive Applications for NDE Sensors

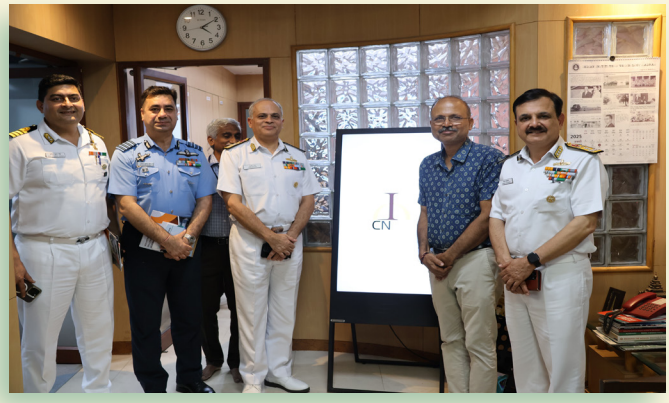
On December 30, 2024, the **ZF Group** visited the **Centre for Non-Destructive Evaluation (CNDE) at IIT Madras. Prof. Krishnan Balasubramanian** showcased CNDE's latest research in **Non-Destructive Evaluation (NDE), structural health monitoring, and performance measurement** in challenging environments.

The **ZF team** examined NDE sensor applications in automotive systems, discussing the requirements and opportunities for advanced integration. Furthermore, the **CAAR team** provided insights into their organization, membership benefits, and ongoing projects, promoting collaboration in automotive innovation.

This visit highlights the strengthening partnership between academia and industry focused on advancing technological progress.

Defense Leadership Visits Centre for Non-Destructive Evaluation at IIT Madras

On January 13, 2025, the **Centre for Non-Destructive Evaluation (CNDE)** at **IIT Madras** hosted a high-level delegation from the Indian Armed Forces, including Vice Admiral Sanjay Vatsayan, **Deputy Chief of Defence Staff, Rear Admiral Purvir Das, Group Captain Nitin K. Mal, and Captain Arun Kumar Singh.**



The visit, led by **Prof. Krishnan Balasubramanian,** focused on the CNDE's ongoing research in **Non-Destructive Evaluation (NDE) and Structural Health Monitoring (SHM). Prof. Balasubramanian** provided an in-depth overview of the center's work, which includes significant projects undertaken for various defence establishments.

The visit underscored the strategic importance of collaboration between academia and the defence sector in advancing technologies aimed at enhancing the safety, reliability, and performance of defence infrastructure.

CNDE Explores New Collaboration Opportunities with Saint-Gobain

The **Centre for Non-Destructive Evaluation (CNDE)** at **Indian Institute of Technology Madras (IIT Madras)** recently held a productive meeting with the **Saint-Gobain** team to discuss potential collaboration opportunities.

The discussions focused on exploring how CNDE's pioneering research in **Non-Destructive Evaluation (NDE)and Structural Health Monitoring (SHM)** can contribute to innovative solutions in materials science and industrial applications. The team from Saint-Gobain, a global leader in building materials, expressed interest in leveraging CNDE's expertise to develop cutting-edge technologies for enhanced infrastructure safety and sustainability.

Led by **Prof. Prabhu Rajagopal,** the meeting highlighted the potential for future partnerships that would bridge academic research with real-world industrial needs. With an emphasis on innovation and collaboration, both parties are excited about the possibilities that lie ahead in advancing solutions for industries that rely heavily on NDE technologies.

The ongoing dialogue underscores CNDE's commitment to fostering partnerships with global industry leaders to drive technological advancements and tackle engineering challenges.

Featured Interviews

IIT Madras Professor Shines Light on Non-Destructive Testing and Innovation Ecosystem

At the **Center for Non-Destructive Evaluation (CNDE),** we are proud to highlight the outstanding contributions of **Prof. Krishnan Balasubramanian**. With over 25 years of expertise in **Non-Destructive Evaluation (NDE),** he has played a pivotal role in shaping the landscape of NDE in India, blending cutting-edge research with entrepreneurial spirit to foster significant global advancements.

In Episode 8 of the "Best Place to Build" podcast, Prof. Balasubramanian delves into the transformative power of NDE, emphasizing its importance in safeguarding critical infrastructure such as bridges, airplanes, and nuclear plants. His deep insights underscore the vital role of NDE in ensuring public safety, preventing catastrophic failures, and extending the operational life of essential assets.

During the episode, Prof. Balasubramanian also discusses the intersection of academia and entrepreneurship, shedding light on how **IIT Madras's** policies, such as **ICSR** and **Intellectual Property (IP)** management, have empowered faculty to pursue entrepreneurial ventures. These efforts have resulted in the emergence of successful **deep-tech startups** born from CNDE's research, including **Dhvani Research, Planys Technologies, Detect Technologies, and Xyma Analytics**—companies that are revolutionizing industries ranging from automation and underwater inspection to I-powered asset management and high-temperature sensing.

Prof. Balasubramanian's journey from **Silicon Valley to IIT Madras** serves as a testament to how academic institutions can drive innovation and create ecosystems that fuel technological advancement. His leadership has been instrumental in the success of these startups, which together employ over 1,200 professionals globally and are making significant strides in addressing critical engineering challenges.

Listen Now: He X-Rays Bridges & Planes | Prof. Krishnan B. | EP.8

Faculty Featurette: Dr. Balaji Srinivasan, IIT Madras

Behind the Innovation: Dr. Balaji Srinivasan's Impactful Journey

In the heart of IIT Madras' thriving innovation and research ecosystem stands Dr. Balaji Srinivasan, a distinguished professor in the D**epartment of Electrical Engineering** and an esteemed member of the **Center for Non-Destructive Evaluation (CNDE).** With his groundbreaking contributions in photonics, fiber optics, and laser technology, Dr. Srinivasan exemplifies the synergy between academia and industry, continuously pushing the boundaries of what's possible.

Research Leadership: Shaping the Future

Dr. Balaji Srinivasan, a distinguished professor in the **Department of Electrical Engineering** and an integral member of the **Center for Non-Destructive Evaluation (CNDE), IIT Madras,** has made remarkable contributions to academia and industry alike. With over 28 high-impact research projects worth ₹2,000 crores under his leadership, he has driven advancements in critical areas such as distributed sensing systems, high-power fiber lasers, and structural health monitoring. His notable projects include DRDO-funded underwater laser communications, pipeline monitoring using Distributed Acoustic Sensing (DAS) in collaboration with GAIL, and fiber optic current sensors that enhance precision in electrical systems.

Dr. Balaji Srinivasan's innovations extend beyond research labs, delivering real-world impact across industries. His Optical Time Domain Reflectometer (OTDR) has been deployed by Telecom Malaysia, while Fiber Bragg Grating Sensors are utilized for structural monitoring by organizations like BHEL and IGCAR. He has also developed multi-kW pulsed fiber lasers for defense applications, which have been commercialized by Unilumen Photonics, and underground vibration detection systems revolutionizing security for BEL.

A prolific academic, Dr. Balaji Srinivasan has authored 71 journal papers, delivered 42 invited talks, presented at 155 conferences, and holds 25 patents. His teaching portfolio includes 17 unique courses such as Fiber Lasers and Applications and Introduction to Photonics, while his mentorship has guided 18 M.S. and 10 Ph.D. scholars, with 9 more currently under his tutelage. Recognized for his excellence, he has received accolades such as the Rajamani Award (2021), the Collegiate Inventor Award (2000), and Senior Membership in the Optical Society of America.

Through global collaborations with institutions like the University of Southampton and EPFL, and national partnerships with DRDO, IISc, and IGCAR, Dr. Balaji Srinivasan continues to address critical challenges in energy, infrastructure, and national security. His vision and dedication not only strengthen India's technological leadership in photonics and fiber optics but also inspire the next generation to illuminate the path of innovation.

Research Highlights

Micron-Scale Imaging Using Bulk Ultrasonics

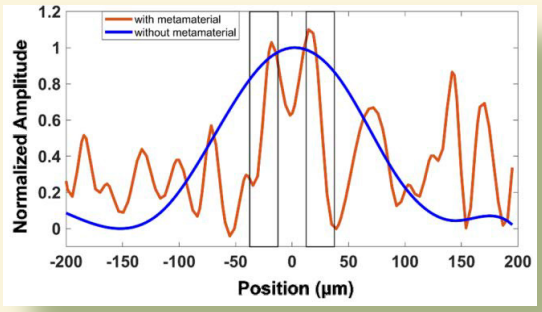
Ongoing Research by PhD Scholar - Loheshwaran

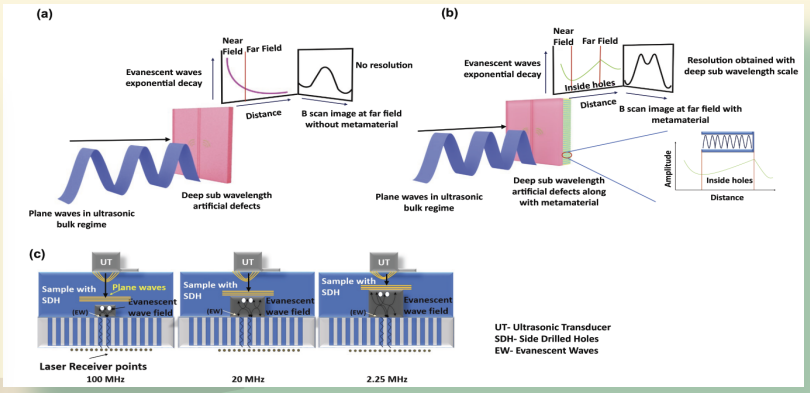
Supervisor: Prof. Prabhu Rajagopal

An extraordinary resolution down to 50 microns is demonstrated for the first time for bulk ultrasonics, using novel micro-fabricated metamaterial lenses. The development and performance of the siliconbased Fabry–Perot type metalenses with an array of 10 micrometre square holes are discussed.

Challenges in wave reception are addressed by a custom-developed micro-focal laser with a sub-micron spot size and an innovative experimental set-up together with physics based signal processing.

The results provide a pathway for material diagnostics at greater depths with high resolution using micro metal-ens-enhanced ultrasound as an alternative to expensive and radiation prone electromagnetic techniques.





CNDE Showcases NDE 5.0 and Launches National Consortium at NDE 2024

The **Centre for Nondestructive Evaluation (CNDE), IIT Madras,** participated in **NDE 2024** as an exhibitor for the first time, marking a significant milestone in its engagement with the **Nondestructive Evaluation (NDE)** community. Organized by the **Indian Society for Non-Destructive Testing (ISNT)**, the event provided an excellent platform to showcase CNDE's expertise in **deep research and technology translation.**

Managed entirely by research scholars and project staff, the CNDE stall attracted over 100 visitors per day and received more than 150 inquiries. Attendees explored innovative technologies developed at CNDE and engaged in discussions on the future of NDE 5.0, a framework that envisions advancements in Nondestructive Imaging, Structural Health Monitoring (SHM), and real-time process monitoring.

Launch of the National Consortium for NDE (NCNDE)

One of the biggest highlights of CNDE's participation was the official launch of the **National Consortium for NDE (NCNDE)**—India's first platform dedicated to fostering **collaborative research in NDE, SHM, and process parameter measurement.** The NCNDE is designed to address real-world challenges by bringing together experts from **academia, industry, and international advisory committees,** covering sectors such as **oil & gas, power, aerospace, manufacturing, and electric vehicles (EVs).**

A Strong Industrial & Research Network

CNDE has built a robust network with key stakeholders, including leading organizations such as **DRDO, ISRO, and industries specializing in defense, infrastructure, and energy.** Its experts, including **Prof. Krishnan Balasubramanian, Prof. Prabhu Rajagopal, and Prof. Balaji Srinivasan**, are at the forefront of developing next-generation NDE technologies that ensure safety, reliability, and efficiency in critical sectors.

A Successful Conclusion & Looking Ahead

The **three-day NDE 2024 conference** concluded with **high-energy technical sessions, panel discussions, and mentorship opportunities,** reinforcing the event's significance in shaping the future of NDT. With a strong foundation in **academic excellence and applied research,** CNDE continues to contribute to the evolving landscape of **Nondestructive Testing and Structural Health Monitoring,** reinforcing its role as a leader in **NDE research and innovation.**

CNDE extends its gratitude to ISNT for organizing such a dynamic platform and looks forward to **expanding its research, industry collaborations, and global outreach in the coming years.**

#NDE2024 #CNDE #IITMadras #Innovation #NDT #FutureOfNDE #SHM

ISNT 34th Annual conference and exhibition on NDE 2024: A Grand Showcase of Innovation in Non-Destructive Evaluation

The **34th Annual Conference and Exhibition on Non-Destructive Evaluation (NDE 2024),** organized by the **Indian Society for Non-Destructive Testing (ISNT),** took place from **December 12 to 14, 2024, at the Chennai Trade Centre, Tamil Nadu.** Themed **"Imagine, Innovate, Inite & Inspire"**, the event brought together leading experts, researchers, and industry professionals to explore the latest advancements and emerging trends in NDE.

A Hub of Knowledge and Collaboration

NDE 2024 was an immersive experience, featuring over **40 keynote talks, 20 technical sessions, and an exhibition with more than 40 participating organizations.** The conference attracted more than 1,500 attendees from diverse sectors, including aerospace, defense, energy, manufacturing, and infrastructure. The event also witnessed the presentation of **over 250 technical papers,** highlighting cutting-edge developments in NDE technologies.

A key feature of the conference was its focus on fostering collaboration between academia, research institutions, and industry leaders. Experts from across the globe convened to discuss the role of NDE in ensuring safety, reliability, and efficiency in various engineering applications.

Exhibitor Highlights: CNDE at NDE 2024

A notable highlight of NDE 2024 was the participation of the **Center for Non-Destructive Evaluation (CNDE), IIT Madras,** which made its debut as an exhibitor. CNDE showcased its deep research capabilities and technological innovations, demonstrating its leadership in **Nondestructive Imaging, Structural Health Monitoring (SHM), and online process parameter measurements.**

The CNDE exhibit, managed entirely by research scholars and project staff, presented cutting-edge projects aligned with the future vision of **NDE 5.0**. The team engaged with industry professionals, researchers, and students, discussing potential applications and collaborative opportunities. Over the three-day event, CNDE recorded nearly **100 visitors per day** and received more than **150 inquiries** about its research and technology.

Additionally, CNDE launched the **National Consortium for NDE (NCNDE)**, a significant initiative aimed at promoting collaborative research in **advanced NDE techniques, sensor development, and AI-driven defect detection methodologies**. This initiative seeks to bridge the gap between research and industry applications, fostering an ecosystem where academia and industry can work togetherto develop cutting-edge solutions.

Industry and Research Synergies

The conference was not just about showcasing innovations; it also served as a platform for critical discussions on industry trends and future challenges. Experts addressed topics such as **AI-driven inspection techniques, real-time structural monitoring, ultrasonic and electromagnetic testing advancements, and the growing role of digital twins in NDE.**

Organizations from **oil & gas, aerospace, nuclear energy, and transportation sectors** exhibited their latest technologies and solutions, reinforcing the event's status as a premier knowledge-sharing platform. The strong industry presence underscored the increasing reliance on **NDE for predictive maintenance, failure prevention, and asset longevity.**

Looking Ahead

NDE 2024 concluded on a high note, with participants expressing enthusiasm for continued engagement and innovation in the field. The conference reaffirmed the importance of NDE in modern engineering and industrial applications, emphasizing its role in ensuring **safety, efficiency, and sustainability.**

For a visual recap of the event, watch the highlights here: **NDE 2024 Highlights**

As the industry advances towards **NDE 5.0**, integrating AI, automation, and digital technologies, platforms like NDE 2024 will continue to play a crucial role in shaping the future of inspection and evaluation methodologies. With the success of this year's event, anticipation is already building for **NDE 2025**, promising even greater advancements and collaborations in the field of Non-Destructive Evaluation.

Special Section: "CNDE Beyond Research"

At CNDE, we're always pushing the boundaries of research and innovation, but beyond the equations, algorithms, and experiments, we're also a community that cherishes its people. And what better way to celebrate than honoring the birthday of our visionary leader, Prof. Krishnan Balasubramaniam!

With over 33 years of groundbreaking contributions in Non-Destructive Evaluation (NDE), spanning maintenance, quality assurance, manufacturing, and design, Prof. Krishnan is not just a scientist but a force of innovation. With 13 startups to his name, he exemplifies the spirit of entrepreneurship, proving that research isn't just about discovery—it's about impact.

But ask any student or colleague, and they'll tell you that beyond his technical brilliance, he's the most chill, friendly, and welcoming mentor one could hope for. His doors (and mind) are always open, and conversations with him often spark ideas that turn into game-changing innovations.

In the world of waves and silent signs,
Where flaws hide deep in subtle lines,
Stands a leader, wise and bold,
With stories of NDE yet untold.

33 years of endless quest,
Turning knowledge into the very best.
From maintenance floors to design halls,
Your vision echoes through research walls.

Not just a mentor, but a guide so kind,
With a chill vibe and a brilliant mind.
Thirteen startups, dreams taking flight,
Shaping futures, igniting light.

With students, you're more than just a name,
A friendly force, a spark, a flame.
Here's to you, on this special day,
May success and joy forever stay

Beyond Research: Srijan Tiwari – A Scholar with Rhythm & Vision

At CNDE, research isn't the only thing that keeps us moving—sometimes, it's the rhythm of a drum or the energy of a well-delivered talk. Meet Srijan Tiwari, an MS Entrepreneurship Research Scholar who is building his startup TIQ World with our Professor Krishnan in the field of NDE 4.0: Digitalisation of NDE Ecosystem, and he also balances academia & entrepreneurship with his passion for dance, percussion instruments, and inspiring young minds.

Beyond his work in NDE, Srijan finds joy in performing at various IIT Madras events, bringing beats and movement to life. But his impact doesn't stop there—he's also a dynamic speaker, delivering sessions on "Challenges and Learnings in Building Successful Ventures" to young, aspiring entrepreneurs. His goal? To ignite the entrepreneurial spirit early, shaping the next generation of innovators.

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