

FIRESIDE CHAT & COFFEE TIME DIARIES WITH

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Fireside Chat & Coffee Time Diaries featuring Dr. S.K Ramesh, Ph.D., FIEEE

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In your experience with ABET and EAB, what are the biggest challenges and opportunities facing engineering education today?

One of the biggest challenges we face is the rapid pace of technological development. It continues to accelerate globally, impacting all disciplines, industries, and economies. Technology is developing at such rapid speeds that rules, laws, and policies are often left trying to catch up. Our current systems of education and workforce development need to adapt to prepare people for jobs that don't exist – a 360-degree ecosystem that engages all stakeholders – learners, employers, education, governments, and more. As technology advances in some societies but not in others, we could exacerbate the widening technology gap in access and equity.

Why is accreditation crucial for engineering programs, and how can institutions ensure they meet the highest standards?

Accreditation provides quality assurance in our professional disciplines. For instance, ABET Accreditation Criteria and Standards are developed by subject matter experts from over 35 professional member societies with input from industry and stakeholders. Criteria that encourage innovation and a set of knowledge, skills, and experiences professionals must possess to excel in their fields and enter the profession. Outcomes-based accreditation focuses on what students have learned rather than what is taught with processes in place to continuously improve the program. This provides quality assurance to the public who can be confident that graduates from ABET accredited programs meet the criteria to build a safer, cleaner, sustainable, and more inclusive world for all of us.

How can engineering education adapt effectively to integrate and prepare students for advancements in fields like AI, robotics, and biotechnology?

Technological expertise will be the currency of the next generation. Professionals working in STEM have an imperative role in creating the technologies to solve the problems that confront the world today and in the future. As AI continues to develop, jobs of the future will require greater collaboration between humans and computers. Engineers will need to continue to apply their skills to leverage these new technologies, plus develop new skills to work closely with machines. Social skills are critical and include tasks that require emotional intelligence rather than cognitive alone. Preparing graduates solely for traditional cognitive skills will not be enough for the future.

Beyond technical skills, what are some key areas where engineering programs can improve student outcomes, like communication, teamwork, and ethical considerations?

I think your question has already covered areas that are critical for success for every graduating engineer and STEM professional. Clearly, communications and teamwork are vital, and collaboration is just as important. Many of the global challenges we face, such as climate change, will require ‘systems-thinking’ professionals who can work collaboratively across cultures. Guided by the highest ethical standards, collaboration requires trust and transparency that can only happen when you have open and transparent communications. All voices are important, and we need to ensure equity and access so that everyone’s voice is heard and included in the conversation.

How can engineering education address the evolving needs of a globalized workforce, preparing students for international collaboration and diverse work environments?

A current focus area for quality assurance agencies is the integration of sustainability and its many subtopics into the students’ educational experience. The need for graduates with the knowledge, skills, and experiences in sustainable design practices along with exceptional fundamentals in the engineering sciences is becoming more critical to the development of tomorrow’s engineering workforce. Future engineers will need to approach all problems with a focus on sustainability as a critical design consideration. A good way for educational programs to integrate this is by using the frameworks developed by Engineering for One Planet and the Lemelson Foundation (<https://engineeringforoneplanet.org/>). Multidisciplinary project-based learning, community-engaged projects such as IEEE Smart Village and EPICS in IEEE are some of the programs those educational institutions can consider in preparing future engineers.

What advice would you give to young engineers seeking guidance and aspiring to leadership roles in the field?

First and foremost, join a professional society such as IEEE so you become aware of the tremendous wealth of resources, programs, and services that are available to improve and enhance your learning in and out of the classroom. Engagement is important, and you will be pleasantly surprised with all the opportunities as you volunteer to serve your profession. For example, you learn to work with others, organize and deliver conferences and workshops, and support pre-university educational programs through outreach activities. And along the way, you get to network with a diverse group of individuals with rich experience who can serve as mentors and guide you on your professional journey. I can vouch for this from my own personal journey beginning as one of the founding members of our IEEE Student Branch over four decades ago. If you are interested, you can check out the story on my profile on the TryEngineering portal (<https://tryengineering.org>) as well as stories from others worldwide across our IEEE network.

How can institutions foster stronger connections with the engineering industry to ensure curriculum relevance and career preparedness for students?

I think most, if not all, institutions understand and recognize that the students who enter their programs today are the future graduates who will be responsible for creating and advancing the technologies that can solve our greatest challenges. Again, I want to reiterate collaboration and networking as important elements to engage industry to ensure that the curriculum is up to date. As a department chair over two decades ago, I built a department-level Industry Liaison Council (ILC) to connect recent graduates from our program to provide alumni perspectives from the industry so that faculty are aware of the tools, trends, and opportunities. As a dean, I led the college to create an Industry Advisory Board (IAB) to provide feedback and suggestions to the department chairs and program leads; while also serving as a source of support and philanthropy to support student scholarships, laboratories, design clinics, and research projects. We scaffolded the department-level ILCs to provide a pathway for members to move up to the IAB as their role in industry evolved to technical/corporate leadership. This infrastructure allowed for close interaction between industry professionals and students across our programs, helping them with career development workshops, job shadowing, Co-Op opportunities, and much more.

What steps can be taken to ensure engineering education is welcoming and promotes diversity in terms of gender, race, and background?

As I observed earlier, it will take systems thinking, and engineers and STEM professionals with diverse backgrounds and perspectives to effectively tackle the global challenges that confront us. Organizations and educational institutions are working hard to ensure they are inclusive and welcome everyone to contribute regardless of their background, language, or culture. Clearly, access and equity are very important to ensure inclusion. ABET has a standing Inclusion, Diversity, Equity, Accessibility (IDEA) Advisory Council that has developed definitions and a framework to guide programs and institutions to promote inclusivity, diversity, equity, and accessibility within ABET, its activities, its volunteer base, and its accredited programs. Meanwhile, ABET's four commissions have been working to incorporate principles of inclusion, diversity, and equity in their accreditation criteria. Presently, changes have been proposed to harmonize definitions across all Commissions to General Criterion 8 (Institutional Support) that address these important issues. These changes were approved in November 2023 and open for public review and comment for a 180-day period through June 15, 2024. We encourage anyone interested to view the proposed changes at <https://www.abet.org/accreditation/accreditation-criteria/accreditation-changes/> and provide comments and feedback.

With the rapid pace of technological change, how can engineers stay updated on advancements and maintain their professional development throughout their careers?

The pace of technological change will continue to accelerate as we are witnessing today with increasing multi- and interdisciplinary collaboration that cuts across disciplines to solve our greatest challenges, from health to energy to the environment, to name a few. Lifelong learning is expected for anyone in the STEM fields to ensure that they continue to grow and progress across their professional careers. Degree programs will continue to evolve to provide customizable education through traditional, online, and hybrid modalities. Standards will become increasingly important to ensure quality assurance as these programs evolve, providing flexible pathways for a wide range of audiences from students to working professionals.

In your view, how can the IEEE play a more significant role in supporting and shaping the future of engineering education globally?

IEEE plays a pivotal role when it comes to engineering education globally. Our strategic goals include being a trusted source of educational service and resources to support lifelong learning, enhance public understanding of engineering and technology, and provide opportunities for career and professional development. We have a vast array of educational programs and services that span the gamut from Pre-University Education to Continuing Education. During my tenure as VP-Educational Activities, I championed the IEEE Learning Network (ILN) in collaboration with multiple OUs across IEEE, Societies, and Councils to provide a one-stop shop for continuing education. Today, ILN (<https://iln.ieee.org>) includes hundreds of courses that serve a broad and diverse audience and continues to grow. I am currently serving on an IEEE ad-hoc on the Future of Education that is looking at several broad themes, including:

The impact of AI on the Educational Landscape Evolution of 4-Year and 5-Year Engineering degree programs making IEEE more relevant to Industry Practitioners

The poster features a dark blue background with a starry pattern. At the top, there are three logos: IEEE, IEEE Young Professionals Education Society, and IEEE Education Society. The main title 'Fireside Chat & Coffee Table Diaries' is in white and orange. Below it, the guest 'Prof. S. K. Ramesh' is listed with his credentials. A circular inset shows the moderator, 'M. Sai Prashanth', with his title. The event date and time are '06th June 2024' at '06:30 PM IST' at 'Novotel Hotel, Hyderabad, India'. Social media icons for Facebook, LinkedIn, and X are at the bottom right.

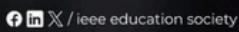
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Moderator
M. Sai Prashanth
Chair, IEEE Education Society YP Ad Hoc Committee

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