Report on Diversity, Outreach, and Development Activities

The IEEE Control Systems Society, through its Diversity, Outreach, and Development Activities (DODA) initiatives, plays a vital role in strengthening the global automatic control community. A cornerstone of these efforts is the Outreach Fund projects. These provide financial support for more than ten initiatives each year. Projects span a broad spectrum. They include campaigns that inspire the next generation of students and researchers to pursue control engineering and organizing scientific workshops and summer schools in developing regions.

The article below highlights one such recent successful DODA initiative that leveraged the Pan-African Robotics Competition to engage and empower African students and young professionals in the field of control systems. Future issues in the magazine will feature other such initiatives.

If this inspires you to propose and organize your own DODA activity, you can find further information at https://ieeecss.org/activities/control-systems-society-outreach-fund.

Karl H. Johansson

Transforming Lives and Building Africa's Future: The Inspiring Journey of the 2025 Pan-African Robotics Competition

IGNITING A CONTINENT'S PASSION FOR STEM

In a continent brimming with youthful potential, the 2025 Pan-African Robotics Competition (PARC) (https://parcrobotics.org/) ignited a beacon of hope, innovation, and inspiration. Founded by Dr. Sidy Ndao (https://www.linkedin.com/in/sidy-ndao-15a85359/), PARC has grown into a profound celebration of Africa's youth and ingenuity and a bold vision for a sustainable, technologically empowered future. This year's event was generously sponsored by the IEEE Control Systems Society (CSS); the Dakar American University of Science & Technology (DAUST; https://daust.org/); CAYTU (https://caytu.ai/), one of Africa's most promising robotics and AI startups; FORCE-N; VEX Robotics (https://www.vexrobotics.com/); IFAC; and a heartfelt contribution from Dr. Timothy Wei in memory of his late parents, Prof. Robert Wei and Lee Wei.

PARC 2025 was actually the culmination of months of preparation and dedication, with teams rigorously developing and refining their projects from their home countries since 24 March 2025.

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Held from 17 to 19 July 2025 in the scenic coastal town of Saly, Senegal, PARC 2025 was actually the culmination of months of preparation and dedication, with teams rigorously developing and refining their projects from their home countries since 24 March 2025. In July, PARC brought together 265 bright minds from 19 countries across Africa and beyond to showcase their innovative solutions and compete on a global stage. The event transcended being merely a competition; it became a dynamic catalyst for transforming lives and communities, propelling young visionaries to the forefront of global technological innovation.

FIGURE 1 Participants from across Africa celebrating at PARC 2025 in Saly, Senegal.

MORE THAN ROBOTS: EMPOWERING AFRICA'S FUTURE LEADERS

Under the powerful theme "Industry 5.0—Shaping the Future of Africa Through Innovation," participants tackled real-world challenges that resonated deeply within their communities. Guided by dedicated African engineers and scientists from the diaspora, such as Dr. Mamadou Diagne (https://jacobsschool.ucsd.edu/people/profile/mamadou-diagne-0) from the University of California, San Diego, an active member of the IEEE control systems community, young competitors became agents of change, developing solutions with tangible impacts on education, industry, agriculture, and beyond.

FIGURE 2 Teams proudly display their national flags on the competition floor.

Participants competed in five leagues, each uniquely designed to harness the creativity and technical prowess of students and young professionals, as follows:

- Techs League (middle school): Resource extraction.
- Stars League (high school): Battery manufacturing.
- Makers League (high school): Security in Industry 5.0.
- Engineers League (university and professionals): Precision agriculture (autonomy and design tracks).

FIGURE 3 A participant fine-tunes their robotics project.

FIGURE 4 Participants collaborate on coding and final adjustments to their robot.

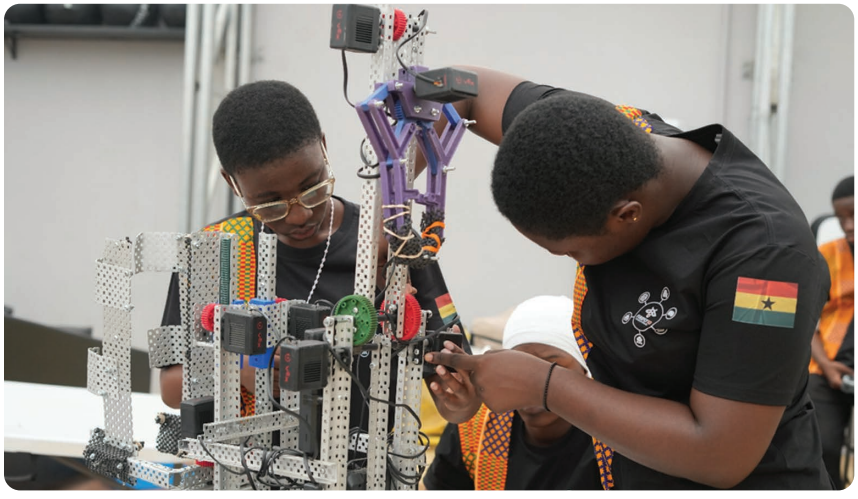

FIGURE 5 Two competitors refine the mechanical components of their robot.

FIGURE 6 Robots navigate the official competition field as teams test their designs in real-world challenge scenarios.

» AI League (professionals): AI and mining.

SOLUTIONS FOR AFRICAN REALITIES

Every prototype and innovation displayed at PARC directly addressed pressing African challenges, clearly demonstrating that these young inventors weren't merely competitors; they were problem solvers dedicated to creating tangible impacts in their communities. From improved methods of resource extraction and safer battery production to advanced precision agriculture techniques designed for smallholder farmers, the ideas showcased at PARC 2025 promise positive transformations in African societies.

STORIES OF IMPACT AND ACHIEVEMENT

The brilliance and perseverance of participants culminated in groundbreaking innovations. RobotsMali emerged as an inspirational story, demonstrating exceptional skill and dedication by securing multiple awards. The DAUST Robotics Club of Senegal captivated audiences with their ingenious precision agriculture solutions, highlighting the transformative potential of robotics in sustainable farming.

The AI League showcased cutting-edge applications, with teams like F&F Madagascar and RobotsMali pioneering a new era of AI-driven mining, ensuring safety and efficiency for future generations. Teams from Uganda, Ghana, Nigeria, Liberia, Burkina Faso, Côte d'Ivoire, Gambia, Zimbabwe, Tanzania, Niger, Kenya, and Cape Verde also brought forward impressive projects, showcasing remarkable solutions in resource extraction, battery manufacturing, security technologies, and precision agriculture. Their commitment and determination became vivid symbols of African youth's potential to lead global technological advancement.

CONNECTING DREAMS, INDUSTRY, AND GOVERNANCE

Beyond showcasing technological excellence, PARC 2025 served as a

powerful platform for collaboration across education, industry, and government. The event fostered meaningful dialogue among students, educators, corporate leaders, and policy makers, underscoring the critical partnerships required for sustainable development.

Intentional spaces were created for young innovators to present their ideas directly to decision makers, bridging the gap between aspiration and opportunity. Industry representatives shared insights into emerging technologies and evolving workforce demands, while government officials highlighted national strategies for advancing STEM education and empowering youth. PARC 2025 demonstrated the potential of aligning education, industry, and government, suggesting that when these sectors invest in a shared vision, they can cultivate a strong pipeline of future engineers, entrepreneurs, and change makers.

WHEN ROBOTICS MEETS CONTROLS

The CSS proudly sponsored PARC 2025, reflecting its deep commitment to supporting STEM education and technological advancement globally. The CSS specifically sponsored and supported the control systems aspects of PARC, prominently within the Engineers League precision agriculture tracks. Participants were tasked with developing robotic systems that combined autonomous navigation, precision control, and real-time feedback systems. These projects highlighted how advanced control theories and robotic technologies integrate seamlessly to produce efficient, sustainable agricultural solutions.

The Engineers League's winning teams demonstrated extraordinary innovations in controls-driven robotics. The DAUST Robotics Club from Senegal, the winner of the design track, excelled in developing control algorithms for targeted fertilizer application in agricultural robots, significantly improving efficiency and sustainability. Similarly, Robots-Mali and Ladybug from Tanzania

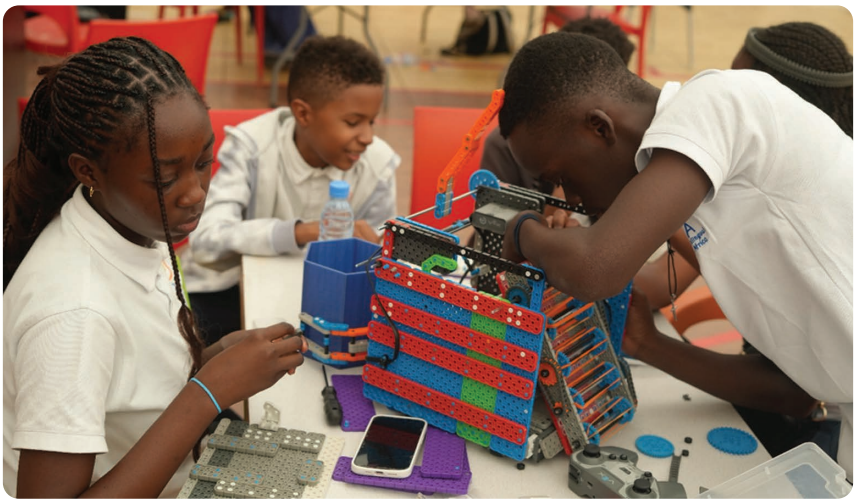

FIGURE 7 Young innovators assemble and refine their robot during PARC 2025.

FIGURE 8 Students test their robot on the practice field.

FIGURE 9 A participant presents his team's project to judges and fellow competitors.

FIGURE 10 A team presents their innovative robotics project during PARC 2025.

FIGURE 11 Young innovators stand proudly at PARC 2025, capturing the energy and promise of Africa's next generation of engineers.

showcased impressive solutions in autonomous navigation and control, securing top awards in the autonomy track. These innovations underscored the essential role of control systems engineering in shaping advanced robotics solutions.

THE JOURNEY CONTINUES: INVEST IN AFRICA'S FUTURE

The extraordinary success of PARC 2025 underscores the importance of ongoing support and investment. Looking ahead, PARC aims to expand its reach and deepen its impact by involving more countries, schools, and industry partners.

PARC provides an unparalleled opportunity for IEEE members and professionals worldwide to engage with and empower Africa's youth, fostering an ecosystem of mentorship, innovation, and inclusive growth. We invite the global community, educators, industry leaders, policy makers, and visionaries, to join us in supporting PARC's transformative journey. Your involvement is not just about funding a robotics competition; it is about investing in a future where African youth are empowered to lead, innovate, and sustainably transform their communities.

Stay connected and support the continued impact at www.parcrobotics.org or reach out via e-mail at info@parcrobotics.org.

Together, let's continue transforming lives and building a brighter, sustainable future for Africa.

—Fatima Kebe, Mamadou Diagne, and Sidy Ndao