

# DEPARTMENT OF COMPUTER ENGINEERING

Presents

## E-Insights



## *About SIEM*



Sandip Institute of Engineering and Management (SIEM) is located in the scenic, eco-friendly and conducive-to-study campus at an elevation off the Trimbak Road (Mahiravani, Nasik) leading to one of the twelve renowned pilgrimages of jyotirlingas known as Trimbakeshwar (abode of Lord Shiva) at the foot hills of Brahmagiri mountain ranges. SIEM is approved by All India Council for Technical Education, New Delhi Government of India and affiliated to Savitribai Phule University of Pune. SIEM is committed to imparting quality education in an atmosphere that will ensure that its students are confident, self motivated and industry-ready. Towards this goal, we are giving importance to qualified and experienced faculty for effective teaching-learning process, equipping our laboratories with best-in-class machines and instrument and developing overall personality of our students (with emphasis on strengthening the fundamentals of subjects, ability to work as a team and good communication skill). There is a well formulated regime with a blend of theoretical learning and practical experience. This enables the faculty to guide the students to learn tomorrow, today.

**Sandip Foundation's**

**Sandip Institute of Engineering and Management, Nasik.**

**Department of Computer Engineering**



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**E-Insights**

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## *About Department*

# *Computer Engineering*

The Department of Computer Engineering sustains and strengthens its teaching and learning program by adapting a comprehensive student centric approach designed to add significant value to the learner in an integrated manner through conceptual and interactive teaching, active lab sessions, seminars, projects, and independent study. As the continued up gradation of the knowledge and skills of faculty members is vital for continuous growth and development of the department, faculties are motivated to attend workshops, seminars, conferences and Training programs. Department has well equipped state-of-the-art laboratories with latest hardware and software configuration for conducting various practical's as well as highly qualified and experienced faculty to nurture the future technocrats of the nation.

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# *Vision and Mission of Institute*

## ***Vision of the Institute***

We at SIEM aspire to be a globally recognized Institute that delivers a world class education to outstanding intellectuals by nurturinc and grooming their interests, creative abilities and thrusts to acquire a life-long learning so as to imbibe values of their commitmen1 towards society.

## ***Mission of the Institute***

We at SIEM shall strive continuously,

- To inculcate and imbibe knowledge of cutting-edge technologies and its implementation for solving real life problems in E conducive environment.
- To collaborate with national and international institutes/industries/universities of repute for sustainable growth through tearr work.
- To motivate and retain highly skilled and knowledgeable individuals, whose creativity and interest in teaching upholds to achieve desired goals. • To provide a dedicated platform to cater the needs of individuals and inspire them for their intellectual growth and character building.
- To enable the students to achieve excellence in the chosen fields and to share the responsibilities of citizenship and service in E disciplined manner.

# *Vision and Mission of Department*

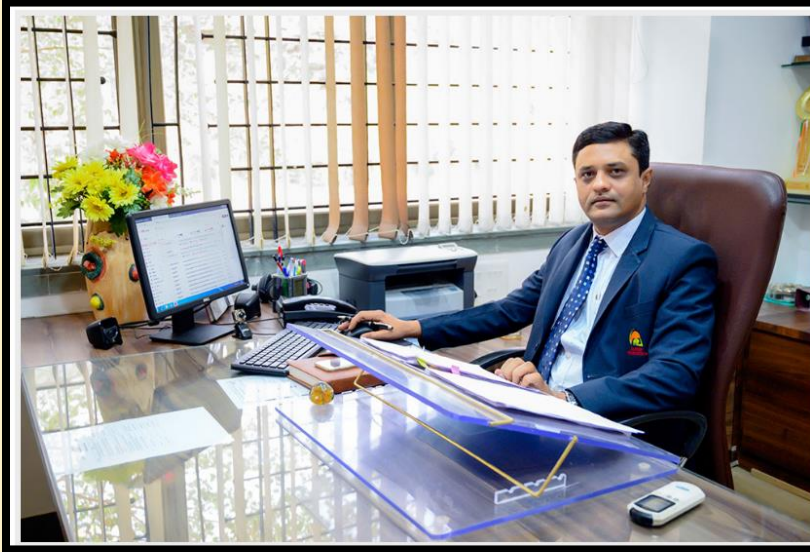
## ***Vision of the Department***

The department aims to be recognised in the field of quality education through excellence in teaching, learning, research and innovation for the betterment of society.

## ***Mission of the Department***

- To provide world class infrastructure with modern tools and technologies for better learning ambiance.
- To enhance problem-solving skills approaches by encouraging young and inspiring minds with innovative teaching & learning.
- To build competent professionals and entrepreneurs through collaborative learning with national and international institutes of repute.
- To contribute in the development of society & nation at large through excellence in research and innovation.

# *Golden Words from Principal*



Welcome to Sandip Foundation's Sandip Institute of Engineering and Management.

Representing Sandip Institute of Engineering and Management is a great matter of pride for

me. In this marvelous campus of Sandip Foundation, we strive to inculcate values in students which nurture them in a way that makes them excel in academics, innovation and personal growth. The prime interest of the institute has always been to impart knowledge, values, skills and wisdom in students to empower them to become the torch bearers of their respective fields.

We support an all-encompassing approach to education that integrates academic concepts with real-world applications. We pledge to deliver each and every stakeholder top-notch facilities and services. In order to integrate academic understanding to real-world problems and applications, our laboratories and research facilities provide students with hands-on learning opportunities.

We encourage our students to engage in extracurricular and intellectual activities as a supplement to their academic endeavors.

These experiences aid in the development of critical life skills, the enhancement of communication abilities, and the formation of enduring connections that will last a lifetime. The institutes additionally offer employability-enhancement programs, value-added programs, and credentials in addition to the primary academic curriculum. Furthermore, we furnish webinars, seminars, guest lectures, workshops, and skill-based training modules for advancing the level of bar of the knowledge of students' field of interest.

In my ability and as this prestigious institution's principal, I can confidently assure you that we are dedicated to creating an orderly and enriching campus environment. To ascertain everyone's success both academically and personally, we place a high priority on their well-being and provide the best assistance whenever required.

Let's change the world together and leave an enduring impression of being an integral part of the Sandip Group of Institutes.

**Thank You. Best Regards.**

**Dr. Dipak P. Patil Principal**

## *Valuable Words from Head of the Department*

Greeting from the Department of Computer Engineering!!

The world is going through a tremendous positive transformation, and in education its effects are clearly visible. We in the Department of Computer Engineering wish to be part of this positive change utilizing our core strengths in Technical knowledge, Research, Data Analytics and world class Infrastructure. Department of Computer Engineering was established in the year 2010 with Batchelor of Computer Engineering (BE) Programme with Intake of 60. Being an integral part of an institution, Sandip Institute of Engineering and Management, Sandip Foundation, Nasik, naturally helps the department and its programmes imbibe all the values and ethos that have made the institute an epitome of excellence.

The rigorous education and training which students get, helps them to tackle the complexity of the engineering and corporate environment as they are able to unshackle themselves from the confines of mere technical competencies. With a carefully designed syllabus by SPPU, we keep up to the true Sandip Foundation tradition of sensitizing ourselves with the latest trends in the industry. The emphasis of the training, Value added Programs in the Department is on building technical as well as people skills, which is indispensable for each of our students to do well in their life.





The class being a heterogeneous mix of academically motivated students from diverse, yet related fields naturally enriches the learning environment, turning it into a fountainhead of vibrant ideas.

The response from both academic institutes as well as industry has been very enthusiastic and encouraging. This bears testimony to the fact that our alumni have made us proud by assuming various positions in reputed organizations like Persistent, Accenture, Amazon, Synel and many more. The placement of the students has been equally encouraging as they have joined many reputed organizations like Infosys, Persistent, Amazon, TCS, Accenture, etc

All these achievements of the department would not have been possible without the enthusiastic and dedicated work of our past and present faculty members. Department faculty members are exceptionally dedicated set of teachers and at the same time top notch researchers in their field of study publishing on regular intervals in reputed journals. They have also done the department extremely proud by writing various books, book chapters etc. Department has also been in the fore front of industry interaction.

We are supremely confident that in years to come Department with its rigorous and regularly updated syllabus, research, innovative teaching techniques and active participation with industry will enforce the reputation of as an enviable seat of higher learning.

**Dr. K. A. Shirsath (Nalavade)**  
**Head, Department of Computer Engineering**  
**Sandip Institute of Engineering and Management, Nasik**



## **01. The Role of Data Science in Business Strategy**

Data science has emerged as a crucial component in shaping modern business strategies. By leveraging statistical analysis, machine learning, and data mining, organizations can make data-driven decisions that enhance operational efficiency, improve customer experiences, and drive revenue growth.

### ***Historical Context***

#### **1. Early Days of Data Analysis (1950s-1980s)**

- *Foundations of Statistics*: Data analysis began with basic statistical methods used in fields like marketing and economics.
- *Mainframe Computers*: The introduction of mainframe computers allowed companies to store and analyze larger datasets, albeit with limited processing power and software tools.

#### **2. Advent of Business Intelligence (1990s):**

- *Business Intelligence (BI)*: Tools such as data warehousing and reporting systems emerged, enabling companies to analyze historical data for decision-making.
- *Data-Driven Decisions*: Organizations started to recognize the importance of data in strategic planning, leading to a more analytical approach to business.

### **3. Rise of the Internet and E-Commerce (late1990s-2000s)**

- *Data Explosion*: The internet led to an exponential increase in data generation. E-commerce companies began to collect vast amounts of customer data, necessitating advanced analysis techniques.
- *Customer Segmentation*: Companies started using data to segment customers and tailor marketing strategies accordingly.

### **4. The Emergence of Data Science (2010s)**

- *Big Data*: The concept of big data emerged, highlighting the challenges of processing and analyzing massive datasets. Technologies like Hadoop and NoSQL databases gained popularity.
- *Machine Learning*: The application of machine learning algorithms allowed businesses to predict trends and customer behavior more accurately, moving beyond traditional statistical methods.

### **5. Integration into Business Strategy (2020s and Beyond)**

- *Real-Time Analytics*: The focus shifted to real-time data processing, enabling immediate insights and more agile decision-making.
- *Data-Driven Culture*: Companies began fostering a data-driven culture, encouraging employees at all levels to utilize data in their decision-making processes.
- *Personalization and Customer Experience*: Data science is now integral to developing personalized customer experiences, optimizing supply chains, and enhancing product offerings.

## ***Roles of Data Science in Business Strategy***

1. **Predictive Analytics:** Companies use data science to forecast sales trends, customer behaviors, and market shifts, allowing them to plan strategically and allocate resources effectively.
2. **Customer Insights:** By analyzing customer data, businesses can identify preferences and pain points, leading to improved products and services.
3. **Operational Efficiency:** Data science helps in optimizing processes, reducing costs, and enhancing productivity through automation and improved decision-making.
4. **Risk Management:** Advanced analytics enables businesses to assess risks and develop mitigation strategies, particularly in finance and supply chain management.
5. **Marketing Optimization:** Data-driven marketing strategies, including targeted advertising and customer segmentation, lead to higher engagement and conversion rates.
6. **Innovation and Product Development:** Insights derived from data can drive innovation by identifying market gaps and guiding the development of new products and services.

## **Conclusion**

The role of data science in business strategy has evolved significantly from rudimentary statistical analysis to a sophisticated, integral part of strategic planning and execution. As organizations continue to embrace data-driven approaches, the importance of data science will only grow, shaping the future of business across industries.

# ***Sustainable Technology***

Sustainable technology refers to innovations and practices that minimize environmental impact, conserve resources, and promote ecological balance. The goal is to create solutions that meet present needs without compromising the ability of future generations to meet their own.

## ***Historical Context***

### **1. Early Concepts of Sustainability (1960s-1970s)**

- *Environmental Awareness*: The modern environmental movement began to gain traction in the 1960s, driven by concerns over pollution, resource depletion, and ecological degradation.
- *Publications*: Influential works, such as Rachel Carson's *Silent Spring* (1962), raised awareness about the effects of pesticides and human activity on the environment, laying the groundwork for sustainability.

### **2. Development of Sustainable Practices (1980s)**

- *Brundtland Report (1987)*: The World Commission on Environment and Development published *Our Common Future*, which popularized the term "sustainable development," emphasizing the need for a balance between economic growth and environmental protection.
- *Renewable Energy Initiatives*: Early investments in solar and wind technologies began, although adoption was slow due to high costs and technological limitations.

### **3. Technological Advancements and the Green Movement (1990s)**

- *Eco-Design*: Companies started adopting eco-design principles, focusing on creating products that are energy-efficient, recyclable, and less harmful to the environment.
- *Rise of Renewable Energy*: Technological advancements made solar panels and wind turbines more efficient and cost-effective, leading to increased adoption in various sectors.

### **4. Main streaming of Sustainable Technologies (2000s)**

- *Green Building Practices*: The construction industry saw a shift towards green building standards, with initiatives like LEED (Leadership in Energy and Environmental Design) promoting energy-efficient and sustainable building practices.
- *Corporate Sustainability*: Businesses began integrating sustainability into their strategies, motivated by consumer demand and regulatory pressures. Companies started to report on their environmental impacts and set sustainability goals.

### **5. Digital Transformation and Sustainable Tech(2010s)**

- *Smart Technologies*: The integration of IoT (Internet of Things) and smart technologies enabled more efficient resource management, such as smart grids and energy management systems.

○ *Circular Economy*: The concept of a circular economy gained traction, promoting the idea of reducing waste through recycling, reusing, and designing products for longevity.

## **6. Current Trends and Future Outlook (2020sandBeyond):**

○ *Climate Change Mitigation*: As climate change becomes a pressing issue, sustainable technologies aimed at reducing carbon footprints—like electric vehicles (EVs) and carbon capture technologies—are gaining prominence.

○ *Sustainable Agriculture*: Innovations in agriculture, such as precision farming and vertical farming, are being developed to produce food more efficiently and with less environmental impact.

○ *Energy Transition*: The shift towards 100% renewable energy sources is becoming a key focus, with advancements in battery storage, hydrogen fuel cells, and grid integration.

### ***Areas of Sustainable Technology***

1. **Renewable Energy**: Solar, wind, hydroelectric, and geothermal technologies that provide clean energy alternatives to fossil fuels.

2. **Energy Efficiency**: Innovations in appliances, buildings, and industrial processes that reduce energy consumption.

3. **Sustainable Transportation**: Electric vehicles, public transport solutions, and bike-sharing systems that decrease reliance on fossil fuels.



4. **Water Conservation:** Technologies for water purification, desalination, and efficient irrigation practices that minimize water waste.

5. **Waste Management:** Recycling technologies, composting solutions, and waste-to-energy systems that reduce landfill use and promote resource recovery.

6. **Green Chemistry:** The design of chemical products and processes that reduce or eliminate the use and generation of hazardous substances.

## **Conclusion**



Sustainable technology has evolved from early environmental awareness to a critical component of modern economic and social strategies. As the world faces pressing environmental challenges, the continued development and adoption of sustainable technologies will play a crucial role in ensuring a sustainable future.

## **02. Cyber security in the Age of Remote Work**

Cyber security in the age of remote work focuses on protecting organizational data, networks, and systems in a landscape where employees operate outside traditional office environments. The shift to remote work has introduced new vulnerabilities, making robust cyber security practices essential for businesses.

### ***Historical Context***

#### **1. Pre-Remote Work Era(1980s-2010s):**

- *Traditional Security Models:* Cyber security practices were primarily designed for on-premises environments, focusing on protecting physical networks within corporate offices.
- *Emergence of the Internet:* As internet usage grew, so did cyber threats, leading organizations to invest in firewalls, antivirus software, and intrusion detection systems.

#### **2. Advent of Remote Work Tools(2000s):**

- *VPNs and Remote Access:* Virtual Private Networks (VPNs) became popular, allowing employees to securely connect to corporate networks from remote locations.
- *Collaboration Tools:* Early tools like email and file-sharing services laid the groundwork for remote collaboration, but security often lagged behind functionality.

### **3. Rise of Cloud Computing (2010s):**

- *Cloud Services Adoption:* As businesses began migrating to cloud services for storage and applications, new cyber security challenges emerged, particularly around data access and compliance.
- *Increased Cyber Threats:* The rise of cyber attacks, including ransom ware and phishing, prompted organizations to reassess their security measures.

### **4. Pandemic-Driven Remote Work(2020):**

- *Sudden Shift:* The COVID-19 pandemic forced organizations to transition to remote work almost overnight. Many lacked the infrastructure to support this shift securely.
- *Increased Vulnerabilities:* The rapid adoption of remote work led to a surge in cyber attacks. Hackers exploited unpatched software, unsecured home networks, and employees' lack of security awareness.

### **5. Evolving Cyber security Strategies(2020s):**

- *Zero Trust Security Model:* Organizations began adopting the Zero Trust model, which assumes that threats can exist both inside and outside the network. This approach emphasizes strict verification for all users and devices.
- *Enhanced Employee Training:* Companies started investing in cyber security training programs to raise awareness about phishing attacks, password hygiene, and secure remote work practices.

## **6. Current Challenges and Future Outlook:**

- *Hybrid Work Environments:* As organizations adopt hybrid models, where some employees work remotely and others in the office, maintaining security across diverse environments presents new challenges.
- *Advanced Threats:* Cyber threats continue to evolve, with increased sophistication in attacks, such as advanced persistent threats (APTs) and supply chain attacks.
- *Regulatory Compliance:* As data privacy laws tighten globally, organizations must navigate compliance while ensuring robust cyber security practices.

### ***Areas of Focus in Cyber security for Remote Work***

1. **Secure Remote Access:** Implementing secure VPNs, multi-factor authentication (MFA), and access controls to protect data when employees connect remotely.
2. **Endpoint Security:** Ensuring that devices used for remote work—laptops, smartphones, tablets—are secured against malware and unauthorized access.
3. **Data Encryption:** Encrypting sensitive data both at rest and in transit to prevent unauthorized access and breaches.
4. **Threat Detection and Response:** Utilizing advanced threat detection tools and incident response plans to identify and mitigate attacks swiftly.

5. **User Awareness Training:** Providing ongoing training for employees to recognize phishing scams, social engineering tactics, and other cyber threats.

6. **Regular Software Updates:** Ensuring that all software and operating systems are up to date to protect against known vulnerabilities.

## **Conclusion**

Cyber security in the age of remote work has transformed significantly, driven by technological advancements and a rapidly changing work environment. As organizations continue to navigate the complexities of remote and hybrid work, prioritizing cyber security will be crucial in safeguarding sensitive data and maintaining business continuity.



## **03. The Future of Work-Life Balance**

Work-life balance refers to the equilibrium between professional responsibilities and personal life, encompassing time spent on work, leisure, family, and self-care. As work environments evolve, achieving a healthy work-life balance is increasingly important for employee well-being, productivity, and overall quality of life. The future of work-life balance is being shaped by technological advancements, cultural shifts, and changing employer-employee dynamics.

### ***Historical Context***

#### **1. Early Work Environments (Industrial Revolution-1950s):**

- *Long Hours and Rigid Schedules:* The Industrial Revolution marked a shift from agrarian to industrial societies, where long working hours and strict schedules were common.
- *Labor Movements:* In response to poor working conditions, labor movements emerged, advocating for shorter workdays and better working conditions, culminating in the establishment of the 40-hour workweek in many countries.

#### **2. The 1960s and 1970s: Changing Attitudes:**

- *Rise of Dual-Income Families:* The post-war economic boom led to an increase in dual-income households, changing traditional family dynamics and placing greater emphasis on managing work and family responsibilities.

- *Work-Life Integration*: Concepts like “family-friendly” policies began to emerge, with companies introducing flexible hours, maternity leave, and childcare support.

### **3. The 1980s and 1990s: The Workaholic Culture:**

- *Corporate Culture Shift*: The 1980s and 1990s saw a focus on productivity and long hours, often glorifying the “workaholic” lifestyle, especially in corporate environments.

- *Emergence of Technology*: The advent of personal computers and early mobile technology began to blur the lines between work and home life, with employees expected to be accessible outside of traditional hours.

### **4. The 2000s: Increased Focus on Balance**

- *Work-Life Balance Initiatives*: Organizations began implementing more structured work-life balance initiatives, recognizing the benefits of employee satisfaction and retention. Policies included flexible work hours, telecommuting options, and wellness programs.

- *Research and Advocacy*: Studies began to demonstrate the positive effects of work-life balance on productivity, mental health, and employee loyalty, influencing corporate policies and societal norms.

### **5. The 2010s: The Rise of Remote Work**

- *Technology and Flexibility*: The proliferation of digital communication tools enabled greater flexibility in work arrangements, making remote work more viable.

- *Cultural Shifts*: Attitudes toward work-life balance continued to evolve, with younger generations prioritizing meaningful work and a healthy balance over traditional career advancement.

## **6. The COVID-19 Pandemic (2020)**

- *Massive Shift to Remote Work*: The pandemic forced a global shift to remote work, accelerating trends toward flexible work arrangements and raising awareness of mental health and well-being.

- *Re-evaluation of Priorities*: Many individuals reassessed their work-life priorities during lockdowns, leading to widespread discussions about burnout, mental health, and the need for better balance.

## **7. Current Trends and Future Outlook (2020s and beyond)**

- *Hybrid Work Models*: Companies are increasingly adopting hybrid work models that allow employees to split their time between remote and in-office work, catering to diverse needs and preferences.

- *Focus on Mental Health*: Organizations are placing greater emphasis on mental health support, including access to counseling, wellness programs, and initiatives that promote work-life balance.

- *Technology's Role*: Advances in technology continue to influence work-life balance, with tools that facilitate remote collaboration and communication while also posing challenges for boundaries between work and personal time.



## ***Areas of Focus for the Future of Work-Life Balance***

1. **Flexible Work Arrangements:** Continued growth in flexible hours, remote work, and hybrid models to accommodate diverse employee needs and lifestyles.
2. **Mental Health and Well-Being:** Increased focus on mental health resources, including employee assistance programs, mindfulness training, and wellness initiatives.
3. **Setting Boundaries:** Encouraging employees to set clear boundaries between work and personal life to prevent burnout and maintain well-being.
4. **Work place Culture:** Cultivating a supportive workplace culture that values work-life balance and recognizes the importance of personal time.
5. **Technology and Productivity:** Finding a balance between leveraging technology for productivity and preventing over-reliance that can lead to work encroaching on personal time.
6. **Diversity and Inclusion:** Recognizing that work-life balance needs can differ significantly among employees based on their backgrounds, responsibilities, and personal circumstances.

## **Conclusion**

The future of work-life balance is likely to continue evolving, influenced by cultural changes, technological advancements, and the lessons learned from the COVID-19 pandemic. As organizations adapt to the needs of a diverse workforce, achieving a healthy work-life balance will remain a critical priority for both employers and employees, contributing to improved well-being and productivity in the workplace.

## **04. Report on Workshop**

### **1. Event Name: Chess Competition**

Chess is a board game for two players. It is played in a square board, made of 64 smaller squares, with eight squares on each side. Each player starts with sixteen pieces: eight pawns, two knights, two bishops, two rooks, one queen and one king. The player with white pieces always makes the first move. This event is open for all branch students.

### **2. This event divided into three rounds:**

1) 1st Round: Knock out round, Two players on each board will play match for 20 min. Max point player will be the winner for second round.

2) 2nd Round: Winner from first round will play with each other for 20 min. Winner will play next round.

3) 3rd Round: Second Round winner will play for final match and max point player will be the winner for tournament.

### **3. Total no. of participant: 51**

### **4. Names of Winner and Runner up:**

1. Kartik Kumbhar, SIEM, Nashik

2. Abhishek Patil , KKW COE, Nashik

## 5.Event Photos:



## **05. Report on Workshop**

### **1. Event Name: Python Coding Competition**

Department of Computer Engineering, SIEM organized an event Python Coding Competition under Tech-Fight 2020 in the TechFest for the year 2019-20. This event is for the students of Computer and Information Technology discipline. It is completely related Python Programming Language.

### **2. This event divided into three rounds:**

1) Online Aptitude test of 20 minutes – 15 objective questions are given for 20 minutes. Total 16 students are shortlisted for second round.

2) Programming +Error Handling: one Problem Statement was given for Python coding and one program was provided for finding the error. Six students are shortlisted for Third round.

3) Technical Round-Personal Interview of all shortlisted students was conducted and considering all parameters winners and runner-up are selected.

Students take this event as an opportunity to show their programming skills and knowledge of Python Programming Language.

**3. Total no. of participant: 29**

**4. Names of Winner and Runner up:**

1. Shivam Kushwaha SITRC.

2. Pravin Pandit , SITRC.

**5. Event Photos:**

