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# Global Research and Education Networks

## Expanding Innovation Frontiers for Pakistan R&E

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Islamabad

August, 30th 2024

istan R&E

and Everyone!



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# Global Research and Education Networks: Expanding Innovation Frontiers



- **GREN (Global Research and Education Network)**
- **GNA-G (Global Network Advancement Group)**
  - Global initiatives that connect research and education communities worldwide.
  - Facilitate advanced collaborations, large data sharing, and innovation across borders.
  - Enable students, researchers, educators, and institutions to access resources, share knowledge, and collaborate on a scale that transcends geographical limitations.
  - Pakistan's Research and Education institutions enhance their capabilities, participating in international collaborations, and contributing to national and global advancements in science and education.





# KAUST: Hub for R&D and Innovation

- **King Abdullah University of Science and Technology - KAUST** is a leading research institution established in 2009, located on the Red Sea coast of Saudi Arabia, dedicated to advancing science, technology, and innovation.
- **Strategic Focus:** KAUST focuses on research in areas such as energy, environment, biosciences, and digital technology. It aims to foster an environment of discovery and innovation that addresses global challenges.
- **Role in Global Research Networks:** As a key player in the GREN, KAUST contributes to international research collaborations, leveraging its advanced facilities like Shaheen III Supercomputer and large network capacity to drive and support scientific breakthroughs.



# Shaheen III



- **Shaheen III** is one of the largest and most powerful supercomputers in the Middle East, and represents the next generation of computing power at KAUST, designed to handle even more complex scientific challenges.
- **Capabilities and Impact on Research:** Shaheen III provide immense computational power that enables researchers to conduct large-scale simulations, complex data analyses, and high-performance computing tasks, that are critical for breakthroughs in fields such as climate modeling, genomics, and energy research.
- **Contribution to Global R&E Networks:** Through its supercomputing resources, KAUST supports global research and education networks by providing the computational backbone needed for international collaborations. This infrastructure allows for seamless integration into global projects, enhancing the overall impact of GREN and GNA-G.







# GREN: Trust, Resilience, Unity and Synergy

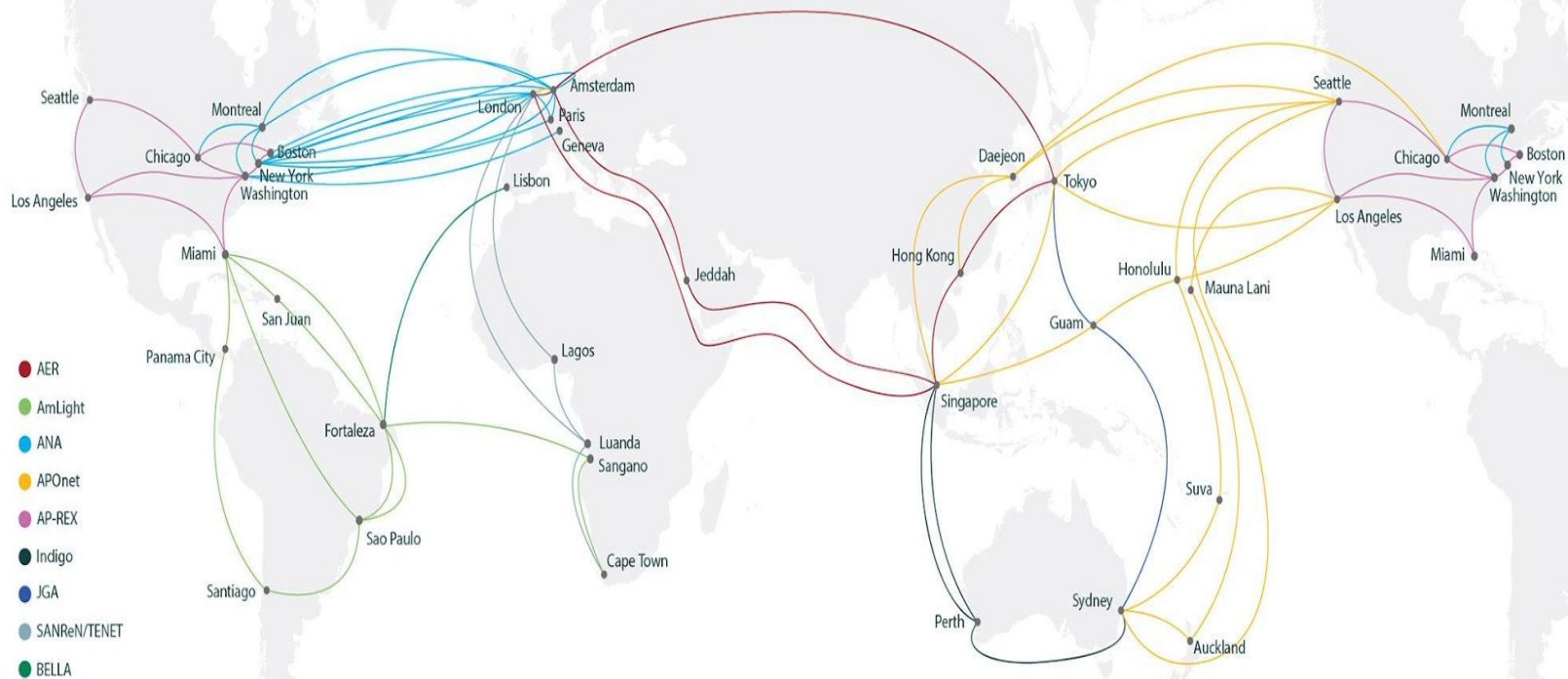
- **Trust:** The foundation of GREN's success is the mutual trust among its participants—institutions and individuals alike. This trust ensures a collaborative environment where knowledge and resources are shared openly and effectively.
- **Resilience:** GREN's structure is designed to withstand challenges and adapt to changing circumstances. Its resilience ensures that research and education activities can continue uninterrupted, even in the face of global challenges.
- **Unity:** GREN unites a diverse array of institutions and experts from around the world, fostering a collaborative spirit that drives innovation and collective problem-solving.
- **Synergy:** The combined efforts and resources of GREN members create a synergy that makes the network more than just the sum of its parts. This collaboration enables groundbreaking research and educational advancements that wouldn't be possible in isolation.





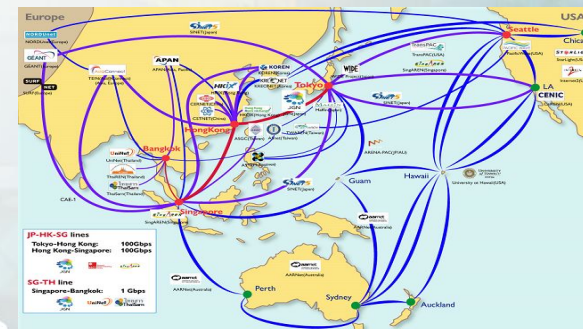
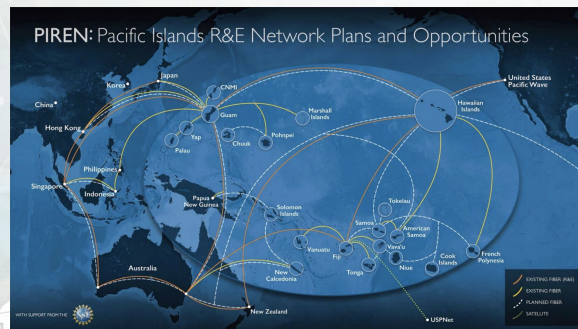
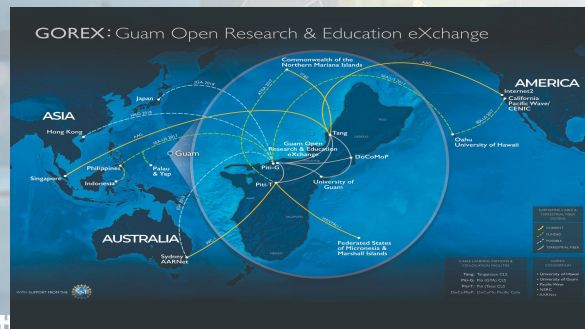
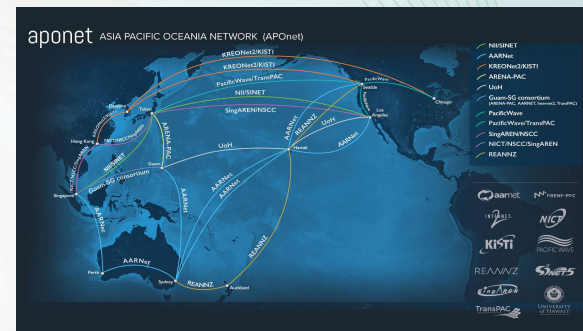
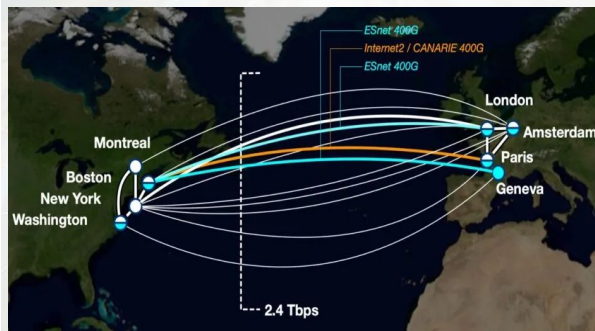
# GREN's Global Connectivity

- **Global Reach:** The GREN connects research and education networks across the globe, from the Arctic to Antarctica, encompassing regions such as Asia-Pacific, Europe, the Americas, and Latin America.
- **Asia-Pacific Europe Ring (AER):**
  - Cooperative arrangement among leading R&E networks, ensuring 100G connectivity between Europe and Asia.
  - Provides backup and resilience in the event of link failures, creating a robust and reliable network infrastructure.
- **Support Regional Initiatives:** **Asia-Pacific Europe Ring (AER)** is a high-capacity backbone for the Asia-Pacific region, complementing other global initiatives like AmLight (connecting the U.S. and Latin America) and ANA (North Atlantic Network Collaboration) that collectively enhance the global R&E network's capabilities.





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# Operations and Innovation



- **Focus on Innovation:** GNA is the pathfinder to make GREN the forefront of technological advancements, exploring innovations like Digital Twins, P4Lab, and Virtual Routing to enhance network capabilities and support advanced research workflows.
- **Multi-Domain Operations:** GREN operates across multiple domains, ensuring seamless integration and coordination between different networks and services. This multi-domain approach is critical for supporting complex, large-scale research projects.
- **Securing the GREN:** Security is a top priority. GREN implements robust security measures, including the adoption of best practices like MANRS (Mutually Agreed Norms for Routing Security) and continuous vulnerability assessments, to protect the network and its users.
- **New Projects and Community Engagement:** GREN continually invests in new projects that drive network advancements. Active community engagement through working groups and periodic meetings ensures that the network evolves in response to emerging needs and challenges.





# Join the GNA Community



- **Join us:** Become part of the GNA-G community, a global network of researchers, educators, and network operators dedicated to advancing research and education through collaboration and innovation.
- **Participation in Working Groups:** Engage with specialized working groups that focus on key areas such as network security, data management, and innovative network services. Contribute your expertise and collaborate with peers on projects that shape the future of global R&E networks.
- **Online Meetings and Forums:** Participate in regular online meetings and forums where members discuss challenges, share insights, and develop strategies to enhance the GREN. These platforms provide opportunities for networking, knowledge sharing, and collaborative problem-solving.
- **Contact Information and Resources:** Access resources and stay connected with the GNA-G community through the official website and mailing lists. Reach out to the leadership team for guidance, support, and to contribute to ongoing initiatives.



# Join us!

- **GNA-G Community Mailing-list:** [all@lists.gna-g.net](mailto:all@lists.gna-g.net)
- **Join a working-group:** <https://www.gna-g.net/working-groups/>
- Come contribute your thoughts & ideas in our online community meeting:  
<https://www.gna-g.net/meeting/>
- Reach out to the Leadership Team
  - Web: <https://www.gna-g.net/contact-us/>
  - Email: [leadershipteam@lists.gna-g.net](mailto:leadershipteam@lists.gna-g.net)



# Closing Thoughts



- **The Future of R&E Networks:** Reflect on the transformative impact of global research and education networks like GREN and GNA-G. These networks are essential in driving innovation, enabling collaboration, and solving global challenges through collective efforts.
- **For the Pakistan's R&E Community:** Pakistan's research and education institutions to actively participate in these regional and global networks. Highlight the benefits of collaboration, resource sharing, and the potential for significant contributions to global scientific advancements.
- **Building on Global Collaboration to Drive Local Innovation:** Pakistan can leverage its involvement in GREN to foster local innovation, improve infrastructure, and enhance its position in the global research community. The collaboration opens new opportunities for growth and development within the country.





# The GREN is in our DNA



Global Network Advancement Group





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Thank you

