

Innovation

for a better world

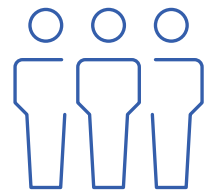
The Technology Innovation Institute (TII) is a global research center dedicated to pushing the frontiers of knowledge. Working together, we deliver discovery science and transformative technology solutions that will not just prepare us for the future, but create it.

Today, we are breaking new ground in quantum technologies, autonomous robotics, cryptography, advanced materials, digital science, directed energy and secure systems. We have also established new areas of specialization in propulsion, biotechnology and alternative energy.

Our possibilities are limitless. As a key pillar of the Abu Dhabi Government's Advanced Technology Research Council (ATRC), TII promotes a culture of exploration with the aim of establishing Abu Dhabi and the UAE as an R&D hub and one of the next global leaders in breakthrough technology solutions.

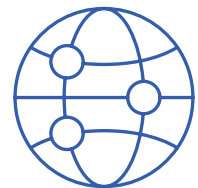
Different by design

At TII, we exist to help build a better world by shaping the most advanced, transformative technological innovations designed to benefit society.



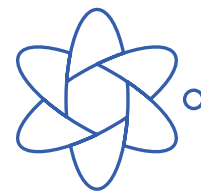
Our leadership

At TII, strong leadership guides us and encourages knowledge sharing, new research, breakthrough discoveries and transformative technology development.



Our mindset

From the outset, we have adopted a collaborative approach to working with research institutions and industry globally.



Our expertise

Our people are among the most inventive thinkers. They are driven by a pursuit of transformative innovation and a commitment to changing the world for the better.



Our capabilities

We invest to create outstanding research areas, ensuring that our teams can work in the most advanced environment.

Rigorous approach, collaborative mindset

At TII, we take a rigorous approach to scientific discovery and inquiry, and bring it all to life through state-of-the-art facilities and collaboration with leading international institutions.

01 Proprietary research

Focused on achieving results

We conduct fundamental and applied research across 10 key areas of focus, with results designed to help solve the world's greatest challenges.

02 Partnership research

Crossing time zones to collaborate

We partner internationally with everyone from research institutes and academic bodies to pioneering startups. Together, we enable groundbreaking advances, IP development, and product and system improvements.

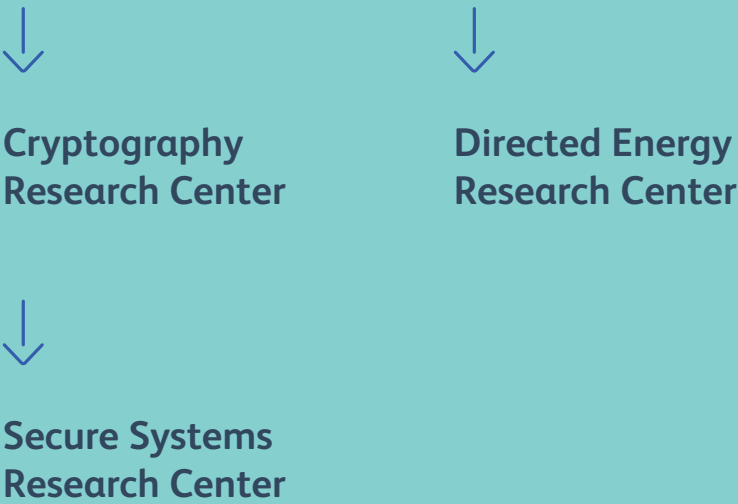
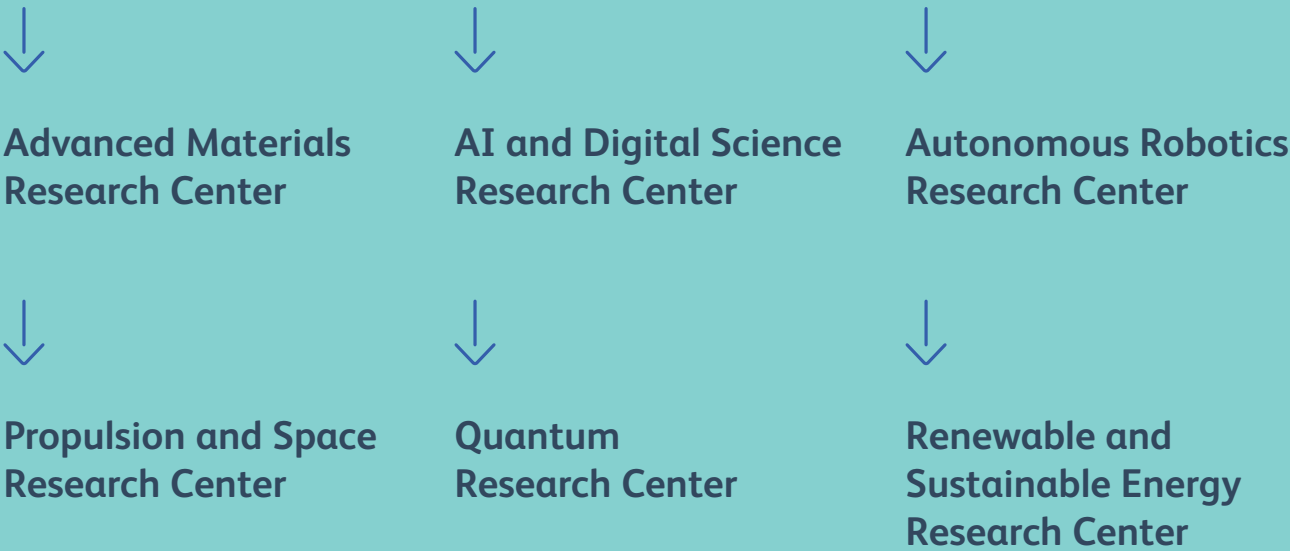
Hubs of knowledge, centers of excellence

Breadth of focus. Strength in depth.

At TII, we have created specialist research centers around our core areas of focus. As the beating heart of our research efforts, each center enables deep dives in the fundamental and applied domains, while working together in advanced interdisciplinary study.

Our core: Artificial Intelligence.

Nothing is closer to the core of our operations than artificial intelligence (AI) – the common tech specialization across each of our research centers. Today, we are focusing on advancing AI and machine learning models, enhancing model robustness and working towards explainable models.



Advanced Materials Research Center

Creating new materials with extraordinary properties

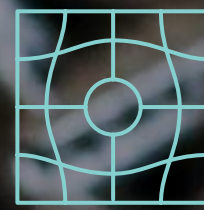
From transportation to sustainability and renewable energy, new materials could enable major new breakthroughs in performance and capability.



Nanomaterials



Smart Materials
and Structures



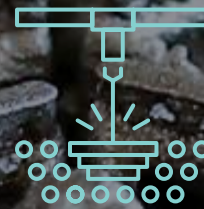
Energy-absorbing
Materials



Self-healing Materials



Metamaterials



Additive Manufacturing



Thermoplastic Composites
Materials



Energy Storage Materials

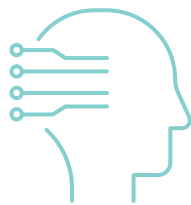
AI and Digital Science Research Center

Surpassing the limitations of human expertise

In the face of evolving technological adversaries, fostering the adoption of safe, sustainable and reliable intelligent autonomous and connected systems, applications and services will support the enablement of digital transformation in our world. Mastering autonomous security reasoning systems is the future to detecting, proving, repairing, and strategizing at speed, scale and with precision.



Data-Driven Technologies and Intelligent Systems



Perception Sensing, and Planning



AI Theory & Algorithms



Computational Systems and Platforms



Intelligent Environments



Next Generation Mobility Systems



Native AI



Advanced Platforms



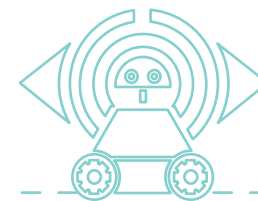
Cyber-Reasoning for Infrastructure Security



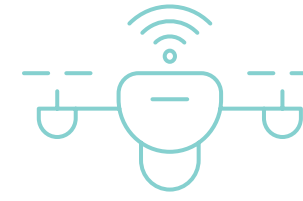
Cyber-Reasoning for Software & System Security

Autonomous Robotics Research Center Going beyond human

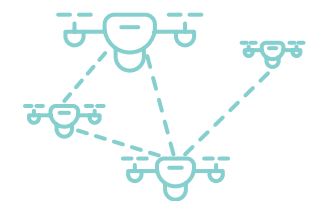
Unmanned vehicles for space, air, land and sea offer exciting opportunities to dramatically improve safety, environmental protection and operational effectiveness.



Perception and Computer Vision



Communication and Networking



Swarm and Coordination

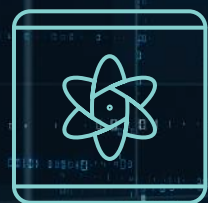


Control and Decision Making

Cryptography Research Center

Protecting the digital realm

In our connected digital world, secure and reliable cryptography is the foundation of digital information security and data integrity.



Post quantum crypto research



Sovereign cryptographic library



Cryptanalysis research



Neuromorphic computing / spiking neural networks



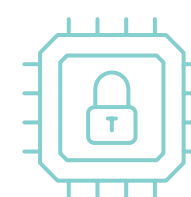
Confidential computing cloud encryption research



Quantum key distribution (authentication)
quantum random number generators



Classic and Post Quantum
Lightweight Crypto
Composites



Crypto Implementation on
Custom Hardware



Crypto Integration In National
Critical Infrastructure

Directed Energy Research Center

Harnessing the potential of high-power energy

Directed-energy systems, such as microwaves, lasers and acoustics represent a powerful emerging technology with new industrial and medical applications. High-power systems also play a key role in the safeguarding of people, assets and forces.



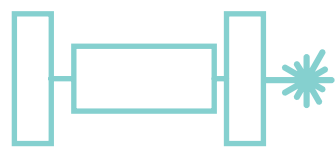
Electromagnetics



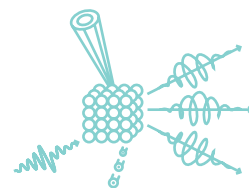
Signals, Electronics & Acoustics



Waves and Machine Intelligence



High Power Lasers



Advanced Photonics Research



Propulsion and Space Research Center Going further

For aeons, we have looked to the skies and the stars. Today, we are innovating the means to journey there, as the product of a fast-growing and ever more confident aerospace sector, in which the UAE has a long-established and pioneering role – with an automated probe already in orbit around Mars – and ambitious plans for tomorrow.



Aerodynamics



Computational
Methods and AI



Aircraft Propulsion and
Turbomachinery

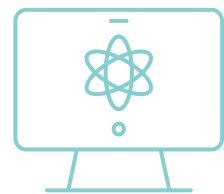


Beyond
Earth Exploration

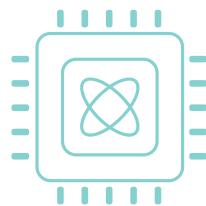
Quantum Research Center

Driving quantum advantage

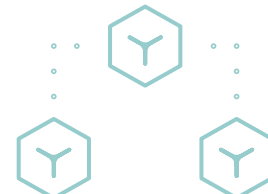
Disruptive leap in computing power offered by quantum technologies is the gateway to new horizons of problem-solving, addressing complex challenges of an entirely different order. Our teams conduct world-class research in the domains of quantum computing, quantum physics, quantum algorithms, quantum sensing, quantum middleware and quantum communications.



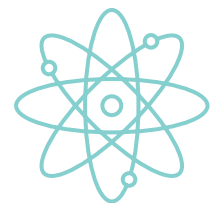
The UAE's first full stack quantum computer



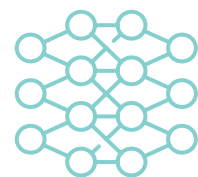
Quantum algorithms for the Energy sector



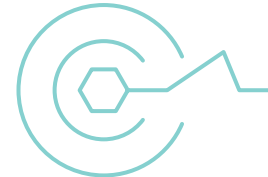
Quantum-inspired Algorithms for complex dynamical systems



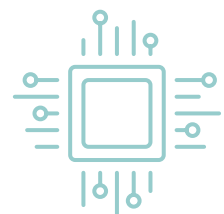
Quantum Random Number Generators



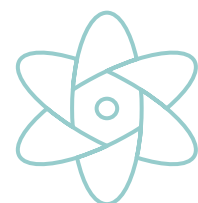
Inertial sensors



Magnetic field sensing



Quantum key distribution (QKD) over fiber and satellite links



QIBO: the open source operating system for quantum computers

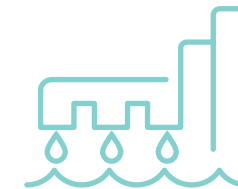


Renewable and Sustainable Energy Research Center Pioneering tomorrow's energy

As the age of coal, oil and gas gives way to a more sustainable tomorrow, the battle is on to discover transformational new forms of energy generation, storage, distribution and more. We live in a warming world in the midst of a global energy transition where the path to a more sustainable tomorrow lies in identifying tech-based applications to address the environmental challenges.



Energy Technologies



Water Technologies



Water-Energy-Biology Nexus

Secure Systems Research Center

Hardening tomorrow's tech platforms

The Secure Systems Research Center (SSRC) at the Technology Innovation Institute (TII) is pioneering zero-trust security, resilience, and safety for cyber-physical and autonomous systems using generative AI and large language models (LLMs). As autonomous technologies—such as unmanned drones, self-driving cars, automated warehouses, and smart city management—become increasingly integral across various industries, robust security measures are paramount. These systems offer transformative opportunities but also introduce unprecedented risks, especially in critical environments like nuclear power plants, industrial operations, and national defense



Zero-Trust Autonomous System Platforms



Zero Trust Mobile Platforms



Zero Trust Communications (Comms) Shield

Expertise ahead of the curve

We offer particular expertise in a range of industry sectors vital to future growth and prosperity, including:

- > Energy
- > Environment & Sustainability
- > Healthcare
- > Security
- > Telecommunications
- > Transport

01 Partnership in action

Collaboration is central to our operations.. Today, we work closely together with leading science and engineering institutions across North America, Europe and Asia, and on groundbreaking research projects anchored at our own center in Abu Dhabi as well as at remote facilities.

02 Inspirational leadership

Guided by an expert Scientific Advisory Board and overseen by ATRC, we operate transparently, with a firm focus on scientific achievement.

Our leadership team has a passion for innovation, along with experience of studying and working at some of the most prestigious universities and companies in the world. In addition, each of our research centers is supported by its own consultative scientific panel.



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