CBG | Cyber@ Ben-Gurion University | Ben-Gurion University of the Negev

About Ben-Gurion University of the Negev

Ben-Gurion University of the Negev (BGU) is the fastest growing research university in Israel. With 20,000 students, 4,000 staff and faculty members, and three campuses in Beer-Sheva, Sede Boqer and Eilat, BGU is an agent of change, fulfilling the vision of David Ben-Gurion, Israel's legendary first prime minister, who envisaged the future of Israel emerging from the Negev. The University is at the heart of Beer-Sheva's transformation into the country's cyber capital, where leading multinational corporations eagerly leverage BGU's expertise to generate innovative R&D.

As it counts down to its 50th anniversary, BGU's mission continues to be effecting change, locally, regionally and internationally. With faculties in Engineering Sciences; Health Sciences; Natural Sciences; Humanities and Social Sciences; Business and Management; and Desert Studies, BGU is a university with a conscience, active both on the frontiers of science and in the community. Over a third of our students participate in one of the world's most developed community action programs. The University is a recognized national and global leader in many fields, actively encouraging multidisciplinary collaborations with government and industry, and nurturing entrepreneurship and innovation in all its forms.

www.bgu.ac.il

# Securing the Connected World

Cyber@BGU

Cyber@BGU

Israel leads the world in the development of online security systems and know-how. Ben-Gurion University of the Negev (BGU) is at the forefront of this battle, bringing together academic expertise, professional experience and the enthusiasm, drive and passion of our researchers and students to create an environment that encourages innovation while developing real-world solutions.

Cyber@BGU (CBG) is the umbrella organization for the broad range of collaborative cyber security, big data analytics and AI applied research activities taking place at BGU. Headquartered in an expanding R&D center at the adjacent Advanced Technologies Park (ATP) in Beer-Sheva, Cyber@BGU serves as a platform for the most innovative and technologically challenging projects in partnership with multinational and local companies and governmental organizations.

The Cyber@BGU initiative has more than 160 highly skilled researchers, students and technical staff. It encompasses, among others, the Cyber Security Research Center, a joint initiative with the Israel National Cyber Bureau, the Telekom Innovation Laboratories in partnership with Deutsche Telekom, the Center for Computational Criminology in partnership with the Israel Police, as well as dozens of additional R&D collaborations with world's leading companies.

Leading Cyber@BGU researchers, Professors Lior Rokach, Bracha Shapira and Yuval Elovici, at a special panel of the World Economic Forum in Davos, January 2018. *Photo: Sandra Blaser/World Economic Forum*

Our Vision:
To lead the world in cybersecurity innovation
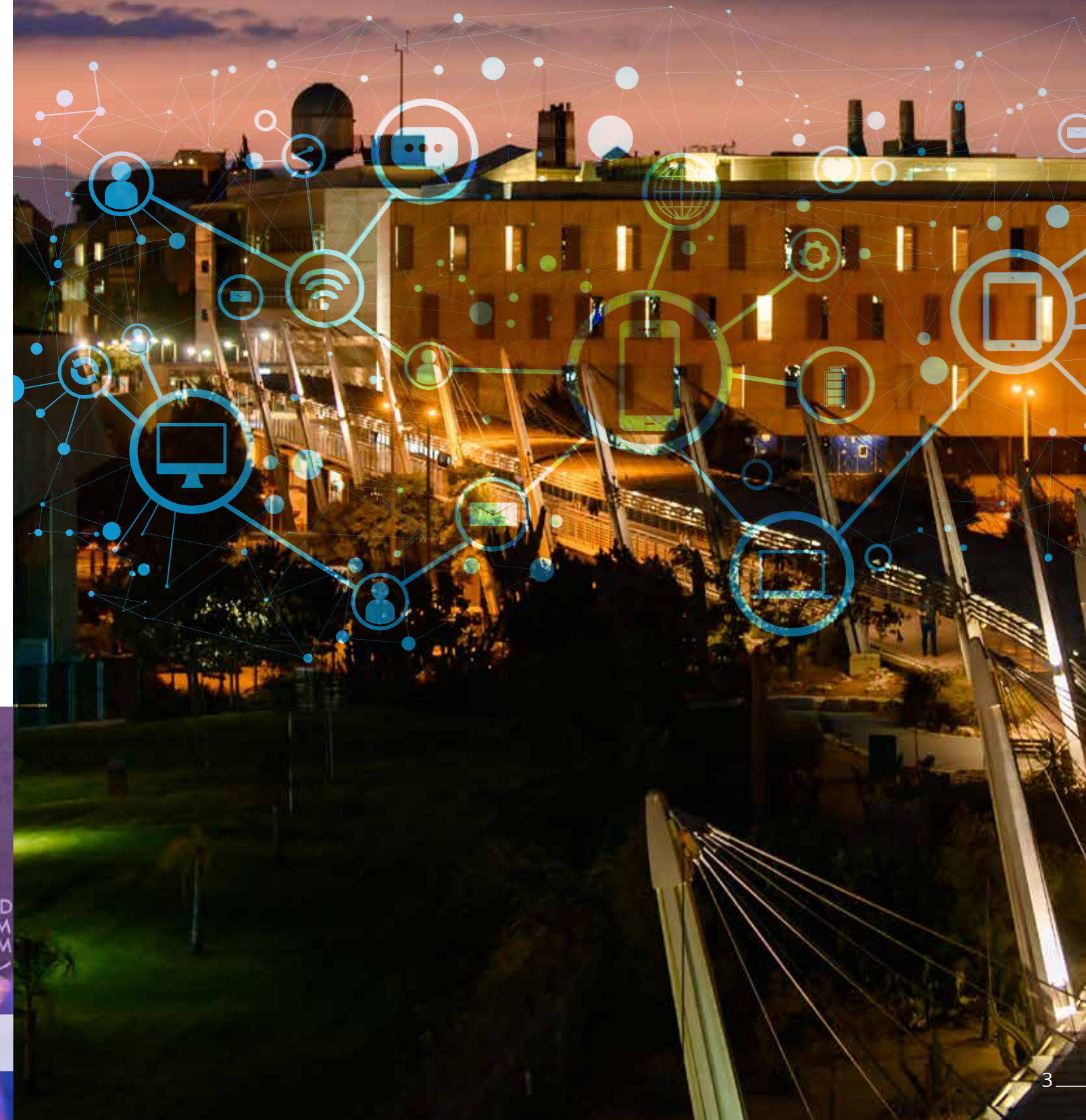
The BGU Advantage

For more than two decades, Ben-Gurion University of the Negev has developed core competencies in a wide range of fields related to information security, particularly as it touches upon mobile devices, cloud computing and the Internet of Things (IoT). Early on, IBM was drawn by this expertise to create a Center of Excellence focused on the protection of critical infrastructure and assets.

BGU was the first university in Israel to introduce cybersecurity study tracks for undergraduate and graduate students, attracting the best and brightest students and researchers from around the world, and is home to Israel's largest department of Software and Information Systems Engineering.

The Department of Software and Information Systems Engineering (SISE) is comprised of dozens of faculty members and hundreds of students enrolled in its various programs, which encompass software engineering, data science, artificial intelligence (AI), and cybersecurity. SISE faculty members conduct innovative basic and applied research, often in collaboration with industry partners, such as IBM, Dell-EMC, Lockheed Martin, Amdocs, Royal Bank of Canada, Deutsche Telekom and many additional blue-chip companies from USA, Canada, Europe, Singapore and Japan.

The Department is home to the Medical Informatics Lab, the Implementation Security Lab, and the Data Mining and Human-Computer Decision-Making Lab, among others. Thanks to these strengths, Deutsche Telekom chose to establish its only R&D facility outside Germany, DT Innovation Labs@BGU, as a collaboration with leading cybersecurity researchers at BGU, focusing on network security, recommender systems and analysis of big data. The multi-faceted challenges of cybersecurity are also being met by researchers in the departments of Computer Science, Electrical and Computer Engineering, Communication Systems Engineering, Education, Emergency Medicine and more.

BGU's experience and expertise are making a difference far beyond the confines of the University. Through Cyber@BGU, partners from business, industry and government in Israel, the US, Japan and Europe can access the entire range of BGU's cyber skills and capabilities to successfully carry out crucial collaborative research projects.

100 Graduate students
researching cyber security **at BGU**

200 Graduate students
in big data and AI analytics **at BGU**

1 in **3**
Israeli engineers graduate **from BGU**

Beer-Sheva recognized as **1** of **7** promising emerging **International tech hubs****

BGU is listed among **Top 100** universities **WITH THE** **LARGEST** **NUMBER OF** **US PATENTS**

100 Start-ups established by **BGN TECHNOLOGIES***

$500 Million
in external funding raised for **BGN-involved startups**

1000 PATENTS registered by **BGN TECHNOLOGIES***

* BGU's technology transfer company

** In a 2015 T3 Advisors study for the Brandeis International Business School

The Cyber Innovation Arena

Beer-Sheva has become a global cybersecurity hub in recent years, attracting major multinational corporations. A study by the Columbia University School of International and Public Affairs cited the cyber cluster surrounding BGU in Beer-Sheva as one of three successful global case studies of "cybersecurity as an engine of growth" thanks to the University's "working relationships with practically every cybersecurity company in the area and a well-developed technology transfer program," as well as local leadership and government support.

The Advanced Technologies Park (ATP), formed through a unique partnership between BGU, the Beer-Sheva Municipality, KUD International, and Gav-Yam, provides state-of-the art laboratory and high-tech office spaces for this thriving ecosystem. Located adjacent to the University, the ATP has become the physical center of cyber innovation in Beer-Sheva.

Building on the success of the IBM Center of Excellence and Deutsche Telekom's Innovation Labs, additional multinational giants have opened research centers at the ATP, including Dell-EMC, Lockheed Martin, WIX, AudioCodes, Mellanox, Allscripts, Taboola, RAD Group and Oracle.

Anticipating the risks that a smart world creates for us as individuals, and for the larger world we inhabit, is the focus of Cyber@BGU

The Israel National Cyber Directorate has also located its Cyber Emergency Response Teams (CERT-IL) at the ATP in Beer-Sheva. Other tenants of the ATP are Israel Aerospace Industries, Rafael (developer of the "Iron Dome"), various service providers such as EY and Deloitte, as well as a plethora of start-ups, venture capital firms, incubators and accelerators and many others.

Over 70 tech companies, with some 3000 hi-tech employees, are presently located at the ATP and enjoy the benefits that come from close proximity and collaboration with Ben-Gurion University. In addition to access to BGU's researchers and labs, companies at the ATP have the pick of BGU's graduates and students. Over the course of the next several years, as construcution of the ATP continues, the Park will become home to some 30,000 of the brightest minds of Israel.

The Israel Defense Forces (IDF) is in the process of moving its most advanced technology units next to the growing ATP campus, where it will also be able to access BGU's research and teaching facilities.

Partnering for Growth

Cyber@BGU is working together with dozens of partners, large and small, including multinationals and governmental institutions from the EU, the USA and Asia, in industries spanning aviation, automotive, banking, telecoms, electricity and critical infrastructure and more.

Some of these partners have established dedicated research labs within Cyber@BGU:

CBG / CSRC — Israel National Cyber Bureau | Cyber Security Research Center

In 2014, BGU and the Israel National Cyber Bureau in the Prime Minister's Office, inaugurated the Cyber Security Research Center (CSRC), with the mission to foster groundbreaking and impactful cyber-security research. The CSRC is currently home to the Malware Analysis Lab, the Internet of Things (IoT) Lab and the Advanced Cyber Security Lab.

CBG — Cyber@ Ben-Gurion University | Telekom Innovation Labs at Ben Gurion University

German telecommunications giant, Deutsche Telekom, began collaborating with and funding research at BGU aimed at protecting its networks from malware in 2004. Today, the DT Innovation Laboratories @ BGU are responsible for the company's most disruptive cybersecurity solutions, as well as a plethora of unique patents.

CBG — Cyber@ Ben-Gurion University | Israel Police Cyber Crime Unit

Inaugurated in 2018, the Center for Computational Criminology is where BGU researchers work side by side with the Israel Police's cyber investigators to develop new artificial intelligence, big data, and machine learning tools for law enforcement.

"The AI revolution of the past few years will prove to be even more significant than DNA testing for law enforcement, providing them with unprecedented investigative tools and new sources of evidence."

Prof. Lior Rokach, head of the Center for Computational Criminology & Chair of the Department of Software and Information Systems Engineering

Timotheus Hüttges, CEO of Deutsche Telekom and Prof. Yuval Elovici, head of Cyber@BGU, director of the Telekom Innovation Labs at BGU and head of the Cybersecurity Research Center. *Photo: Cyber@BGU*

CBG at Cybertech 2018, Tel-Aviv

Cyber Competencies

Core competencies under the Cyber@BGU umbrella are concentrated in the realms of cybersecurity, data science and big data analytics. These are crucial areas in ensuring the protection of national and private sector infrastructure and in leading the vanguard of the cyber battle.

Additional expertise includes:
- AI, machine learning and deep learning
- Deep understanding of targeted attacks and security mechanisms
- Cyber-physical systems and critical infrastructure security
- Big Data analysis for cybersecurity
- Adversarial AI
- AI-based cyber defense
- Security analytics
- IoT security
- Cyber for intelligent transportation
- Cyber for aviation
- Cross-platform malware detection
- Blockchain
- Mobile network security
- Secure mobile computing architectures
- Bridging the airgap
- Ransomware analysis
- Fraud detection
- User profiling (private and public)
- Honeypots – network, social, OS
- Machine learning-based threat detection
- Privacy-preserving algorithms
- Malware analysis and prevention
- Security risk analysis

For more information, visit our website: https://cyber.bgu.ac.il/

Services provided

Cyber@BGU researchers and developers possess excellent analytical skills, flexible thinking, curiosity and determination, and a range of vendors and government agencies worldwide are taking notice. No wonder we are sought after for projects big and small, as long as they are innovative. Most recently, the Royal Bank of Canada invested 2$ million in research aimed at defense against cyber-attacks on AI-based systems at CBG, and NTU Singapore signed an agreement with BGU to form a partnership to combat advanced cyber threats.

As Beer-Sheva becomes a global cybersecurity hub, it attracts additional major multi-national corporations wishing to tap into this ecosystem's cutting-edge technology and top talent. Multinational giants Amdocs and Paypal have also recently signed joint research agreements with BGU to cooperate on artificial intelligence and machine learning.

Many more collaborative research opportunities abound in this rapidly growing field. **BGU's technology transfer company, BGN Technologies, is eager to welcome additional companies** and entities to the burgeoning Beer-Sheva hub.

"Beer-Sheva will not only be the cyber capital of Israel, but one of the most important places in the cyber security field in the world."
Prime Minister Benjamin Netanyahu, January 2014

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