

Major automakers fear the global chip shortage could persist for some time

Global Chip Shortage issue intensifies, wait times hit record 21 weeks

GM to cut North American production, citing chip shortage

Global chip shortage hits all-time high with a wait time of 21 weeks

Explained: Why the global chip crisis end

Expected to cost auto makers in revenue in

Explained: How chip shortage is impacting automakers, other industries

# The Global Chip Shortage

Explained: How global chip shortage may spoil festive season sales

After Maruti, Mahindra warns of 20-25% production loss due to chip shortage

Most other auto firms in India including Tata Motors, Hyundai Motors, Kia Motors, Nissan, Renault and Honda Cars have either already curbed production or will do so soon

Production 40% in

Longer Amid Chip Shortage

Maruti Suzuki to slash output in September by 60% over chip shortage

Maruti Suzuki to slash output in September by 60% over chip shortage

Closure of Bosch plant in Malaysia hurt production in September

- **World's Most Innovative Industry**
- **6 Segments... Extremely Global**
- **\$4.2 Trillion of Company Sales**

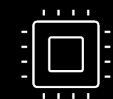
# Trends, Challenges & Focus



**Powerful global forces compelling rapid changes**



**Need to acknowledge and act upon challenges in the near term**



**Technology-enabled opportunities empower organizations to stay competitive**

## Trends & Challenges

### Empowered Consumers:

- *Highly informed, technology savvy and demanding consumers*
- *Rising influence of Social media and mobile technology*
- *Quest for extensive user experience – not just quality products*

### Technology Impacts:

- *Much more complex, intelligent and connected products than ever before*
- *Explosion of data and information*
- *Demand for smart appliances and wearables.*

### Globalization:

- *Growing interconnectivity is changing the way businesses operate*
- *Great changes in consumers' buying process and patterns*

### Sustainability & obsolescence:

- *Demand for greener solutions by Govts and clients*
- *Hunt for low priced and faster product releases*
- *Reduced shelf lives and margins*

### Shifting power centers:

- *Economic power shift from the developed to emerging markets*
- *Nontraditional electronics firms driving increased competition.*

## Focus to create differentiated customer experience

### New Focus



#### New Business Models

- Develop New ways of realizing and monetizing value
- Carefully manage the shift from Capex to Opex
- Partnering with retail and fulfillment service provider to focus on selling, lower shipping cost and reduced operating cost

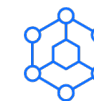
### New Ways to Work



#### Embracing Technology

- AI powered digital reinvention for product differentiation and innovation
- Adopting cloud solution for seamless business transformation
- Robotic process automation for productivity and agility
- IOT solutions to streamline operations by connecting devices and systems

### New Expertise



#### Connected Ecosystems

- Decapitalizing infrastructure and leveraging partner and full network strengths
- Blockchain to create new revenue by improving efficiency and transparency



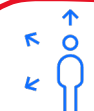
#### Market Activation

- Creating strategy and execution plan for delivering experiences to the market
- Engaging and monetizing customer relationship
- Trust, transparency and bias avoidance



#### Responsive Operations

- Digitizing products, services and processes to redefine user experiences
- Embedding situational awareness throughout the value chain



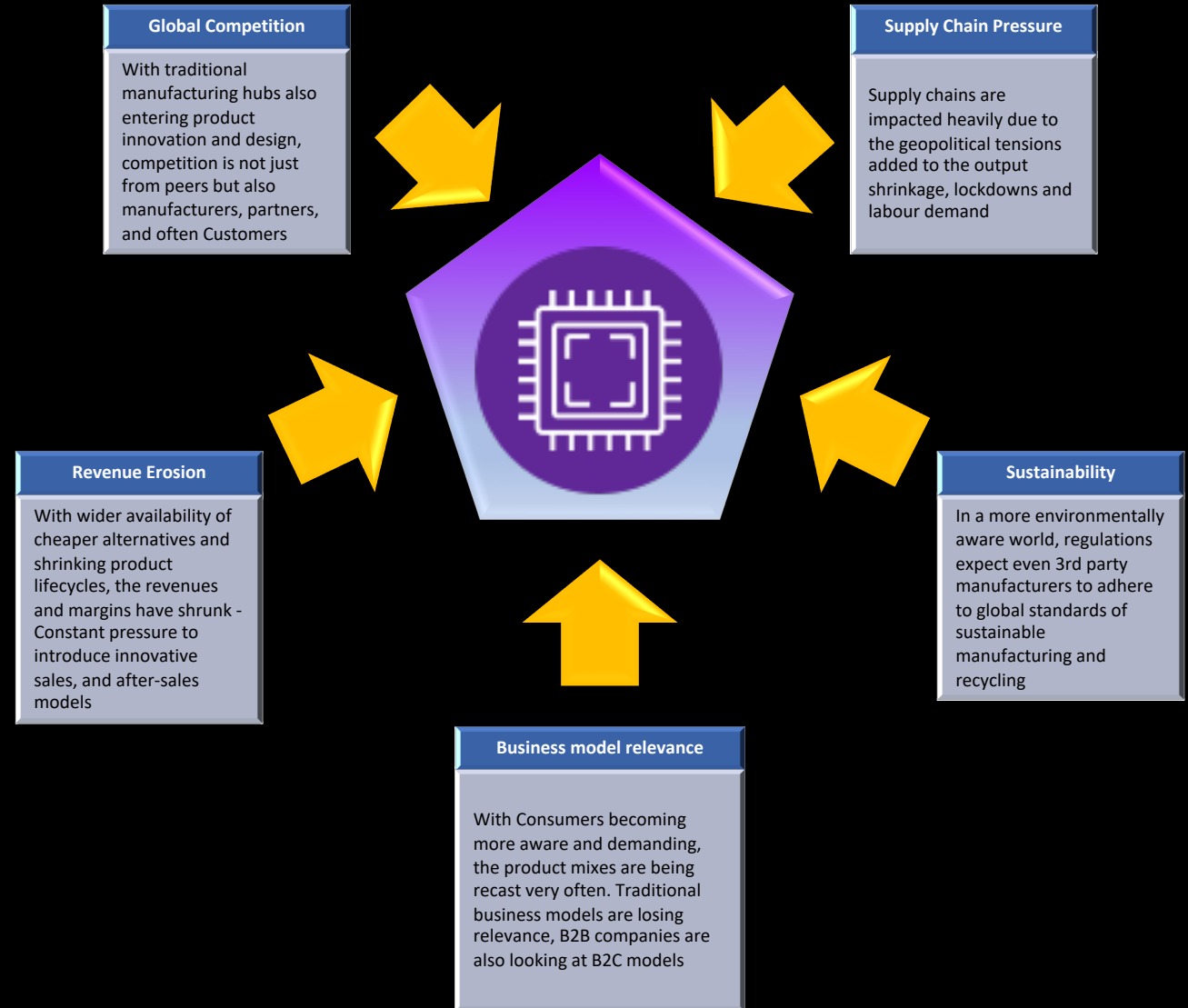
#### Restless Talent

- Identifying, retaining and building the right talent for a digital organization
- Creating a culture of design thinking, agile working and innovation



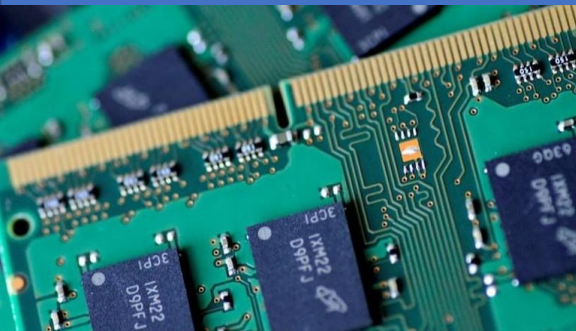
# Companies face significant challenges in a post Covid-19 world

- The Electronics industry overall has not been as severely impacted as some others, but the subsegments have experienced varying levels of impact
- There is pressure on cash flow, and the need to ensure business continuity, cut costs and innovate
- Many companies have restructured their business, exploring newer engagement models and offerings
- Semiconductor companies race to embrace digital technologies, but at a slower pace than some other industries



# What is the Global Chip Shortage?

- Semiconductors are in almost everything today – phones, computers, televisions, refrigerators, cars, and the list goes on...
- Only a handful of companies (Fabs) manufacture the chips for the rest of the world, and they are all saturated
- All downstream manufacturing dependent on semiconductors is slowing down
- Order fulfilment lead times are increasing as there is no inventory



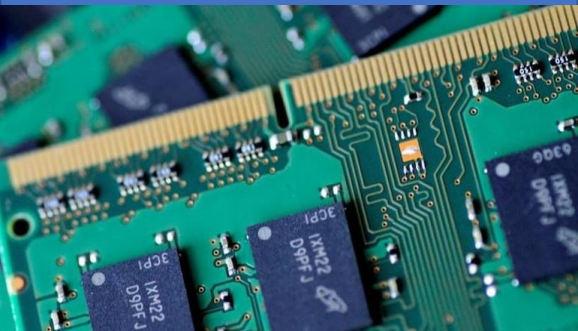
2Q21 Top 10 Semiconductor Sales Leaders (\$M, Including Foundries)

2Q21 Rank	1Q21 Rank	Company	Headquarters	1Q21 Total IC	1Q21 Total O-S-D	1Q21 Total Semi	2Q21 Total IC	2Q21 Total O-S-D	2Q21 Total Semi	2Q21/1Q21 % Change
1	2	Samsung	South Korea	16,152	920	17,072	19,262	1,035	20,297	19%
2	1	Intel	U.S.	18,676	0	18,676	19,304	0	19,304	3%
3	3	TSMC (1)	Taiwan	12,911	0	12,911	13,315	0	13,315	3%
4	4	SK Hynix	South Korea	7,270	358	7,628	8,762	451	9,213	21%
5	5	Micron	U.S.	6,629	0	6,629	7,681	0	7,681	16%
6	6	Qualcomm (2)	U.S.	6,281	0	6,281	6,472	0	6,472	3%
7	8	Nvidia (2)	U.S.	4,842	0	4,842	5,540	0	5,540	14%
8	7	Broadcom Inc. (2)	U.S.	4,364	485	4,849	4,400	490	4,890	1%
9	10	MediaTek (2)	Taiwan	3,849	0	3,849	4,496	0	4,496	17%
10	9	TI	U.S.	3,793	235	4,028	4,030	269	4,299	7%
—	—	Top-10 Total		84,767	1,998	86,765	93,262	2,245	95,507	10%

(1) Foundry (2) Fabless

Source: Company reports, IC Insights' Strategic Reviews database





## Why did it happen?

Explosion in devices and technology – soaring demand for IoT, 5G, EV

Pandemic induced demand for personal, entertainment and home-office electronics

Limited production capacity and prohibitive cost of expansion

Pandemic impact on manufacturing and port shutdowns

Geopolitical tensions

Demand forecasting failure in automobiles

Supply chain cost challenges

## Who are impacted?

Automobiles

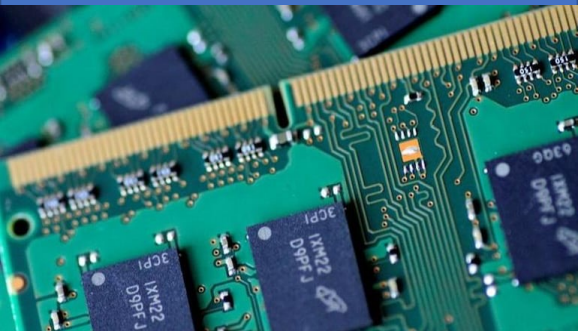
Consumer Durables

Industrial Electronics

Communication Equipment

In short, EVERYONE...





## What does it mean in the near future?

Shipping and delivery will take longer – already wait times are at 21 weeks

Used car sales going up as new models are held up

Smaller brands will face uncertainty

Prices will go up across almost all categories of products

More manufacturing facilities will come up in US, India in the race too

## When will it end?

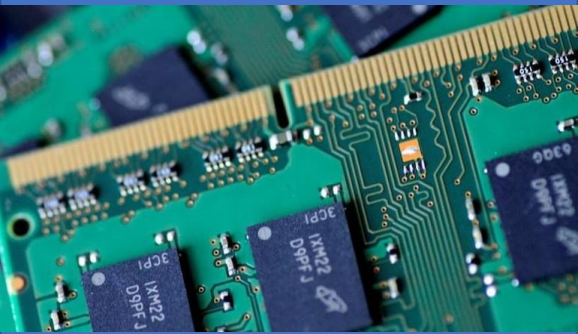
As per leading industry CEOs, the crisis is expected to last until end 2022

Production catches up with demand

Newer facilities add to the supply



# IBM Global University Programs



[www.ibm.com/university](http://www.ibm.com/university)

# Historically Black Colleges and Universities

- The Higher Education Act of 1965, as amended, defines an HBCU as: “...any historically black college or university that was established prior to 1964, whose principal mission was, and is, the education of black Americans, and that is accredited by a nationally recognized accrediting agency or association determined by the Secretary [of Education] to be a reliable authority as to the quality of training offered or is, according to such an agency or association, making reasonable progress toward accreditation.”

<https://nces.ed.gov/COLLEGENAVIGATOR/?s=all&sp=4&pg=1>

## CARES Act: Higher Education Emergency Relief Fund

Secretary DeVos Delivers Nearly \$1.4 Billion in Additional CARES Act Relief Funds to HBCUs, Minority Serving Institutions, and Colleges and Universities Serving Low-Income Students



As industries are transformed by newer technologies, jobs are being created that demand newer skills.

“Learning is a continuous process— not an episodic event. It’s a mindset driven by a quest for knowledge and passionate curiosity.”

- IBM CEO Arvind Krishna





# IBM Global University Programs

IBM  
Academic  
Initiative

IBM  
Skills  
Academy

IBM  
University  
Awards

IBM  
University  
Guest  
Lectures

## MISSION STATEMENT

We **are the intersection** of academia and IBM providing technology, supporting research and creating assets to advance relevant skills for today's workforce

Providing **technology**

Supporting **research**

Supporting **advancement** of **relevant skills** for today's workforce

### IBM Academic Initiative

No-charge access to select IBM technology. This includes:

- Cloud
- Software
- Courseware

### IBM Academic Awards

- IBM Academic Awards
- IBM PhD Fellowship Awards
- IBM Masters Fellowship Awards

### IBM University Guest Lectures

The IBM University Guest Lectures program mobilizes technical SMEs to speak on topics in their expertise to students in university settings.

### IBM Skills Academy

- Skills-oriented training program
- Building strategies for teachers
- Bridging the skills gap between the classroom and industry

# Participating universities from around the world

12,000+  
Faculty users

900,000+  
Students benefitting

10,000+  
Academic institutions

1M  
Certificates  
earned

334  
Courses

110+  
Countries





**IBM Academic Initiative** enables students and faculty at accredited academic institutions to access select IBM resources through a no-charge, self-service program that will provide them with the requisite skills to help distinguish themselves in their career.



# Data Science

[ibm.com/academic/technology/data-science](https://ibm.com/academic/technology/data-science)



## Resources

**Data Asset eXchange** - An online hub for developers and data scientists to find free and open data sets under open data licenses.



## Courseware

**OpenDS4All** - Project created to accelerate the creation of data science curriculum at academic institutions.

**IBM Watson Studio – ML/DL made easy** - Explore multiple machine learning and deep learning capabilities of IBM Watson Studio.



## Software

**Watson Studio Desktop** - Integrated SPSS Modeler functionality to drag-and-drop your way to ML, model building, and data exploration.

**ILOG CPLEX Optimization Studio** - Analytical decision support toolkit for rapid development and deployment of optimization models using mathematical and constraints programming.



## Badges

**Data Science Foundations (Level 1)** - With this badge, the participant will understand data science skills and profession and discuss different use cases where Data Science has been relevant to solve real problems.

**Python for Data Science** - The badge earner will be able to write their own Python scripts and perform basic hands-on data analysis using our Jupyter-based lab environment.

# Through the IBM Academic Initiative portal, you get...

---



**No-charges for classroom**  
and non-commercial research



Access to **commercial-grade software**



**IBM Cloud** access and  
cloud-based resources



Faculty access to  
**enterprise-quality courses**



Access to IBM **digital badge courses**



Central location to find important  
**IBM content and education sites**



# IBM Skills Academy

A combined skills-oriented training program to help empower students' world over from various academic backgrounds with the right mix of skills needed to excel in today's ever evolving, high demand job market.

<https://skills-academy.comprehend.ibm.com>



**Artificial Intelligence    Blockchain    Cloud Computing    Cyber Security    Data Science    Design Thinking    Internet of Things    Quantum Computing**

# Overview

## What is IBM Skills Academy?

- A skills-oriented training program to empower students of various backgrounds with the skills needed to excel in today's high-demand technologies.

## How does it work?

We provide a cloud-enabled learning environment and train-the-trainer learning model leveraging IBM and open source technology.

Upon successful course completion, the faculty and students can receive badges on relevant skills.

---



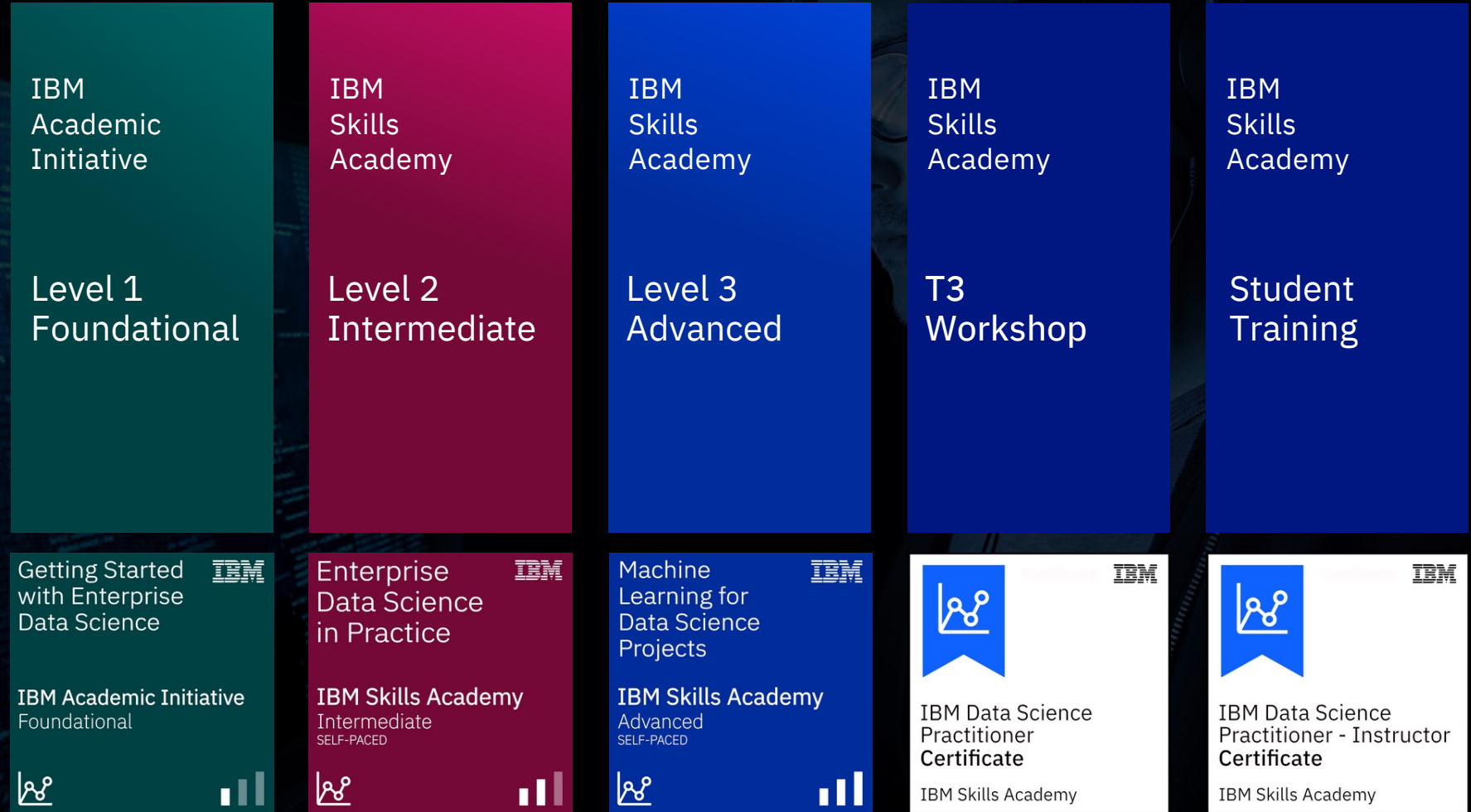
# Course progression- Badges earned

*“A learning curve is essential to growth.”*

Tammy Bjellanda

## Self-paced courses (SPVC\*)

## Instructor-led (ILO)



# IBM Global University Program Awards

Supporting research and curriculum innovation



## IBM PhD Fellowship Awards



Professors submit nominations in response to solicited, published program announcements. Eligibility requirements and objectives for each competition are included in the invitation.



## IBM Masters Fellowship Awards



Professors from under-represented minority colleges and universities in the US, submit nominations in response to solicited, published program announcements. Eligibility requirements and objectives for each competition are included in the invitation.



## IBM Academic Awards



These awards support the success of collaborations between university faculty or programs and internal IBM nominators. Nominations for these awards are initiated by an IBM employee, who will be the technical contact, work the nomination through the vetting process, and actively participate if the nomination is successful.



# IBM University Guest Lectures

---

- The IBM University Guest Lectures program mobilizes a global network of technical subject matter experts (SMEs) who serve as IBM Academic Ambassadors to speak on topics in their expertise to students in university settings. Lectures are available, in the classroom, virtually or on demand.

300

Lecture topics

419

Multiple languages

919

Lectures delivered

422

SMEs involved

422

Lectures Posted on Site

[ibm.biz/ibmguestlectures](https://ibm.biz/ibmguestlectures)



# IBM Higher Education Update on HBCU's Institutions

HBCUs produce 27 percent of all African American STEM graduates

40 percent of all African American engineers

50 percent of all African American lawyers

50 percent of all African American public school teachers

80 percent of all African American judges

Despite only educating 10 percent of all African American college students.

<https://www.congress.gov/116/crec/2019/12/03/CREC-2019-12-03-pt1-PgH9212.pdf>

Valinda Kennedy <https://twitter.com/vscarbro>

IBM Global University Specialty Programs Manager  
Medical, Legal and Historically Black College's and Universities (HBCUs)

[ibm.com/university](https://ibm.com/university)

