IBM “5 in 5” 2018

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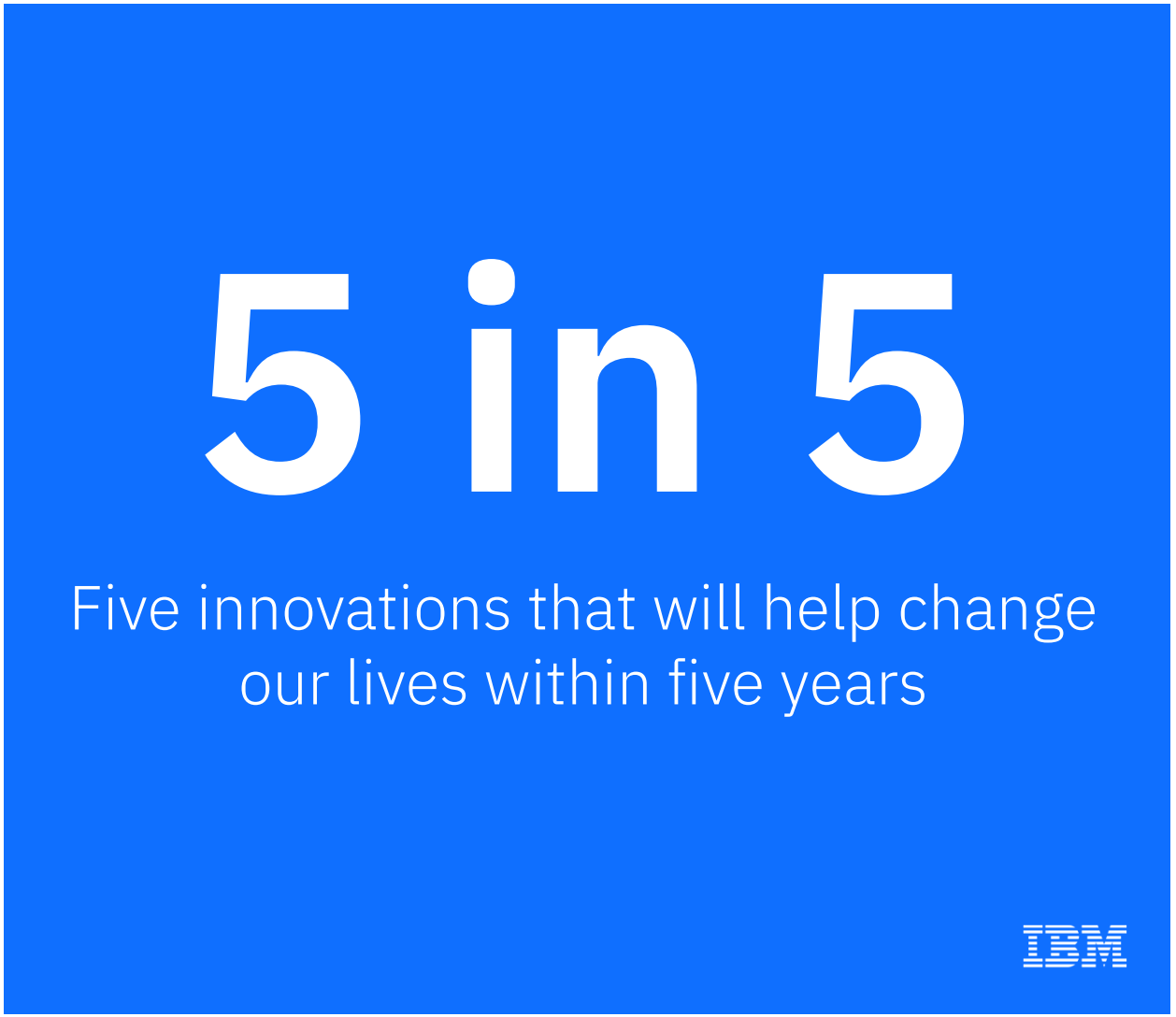
Thomas Landolt
Managing Director IBM



What is the 5 in 5?

Each year, we showcase some of the biggest breakthroughs coming out of IBM Research's global labs – five technologies that we believe will fundamentally reshape business and society in the next five years.

Why here?

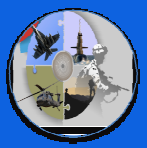
All the technologies presented in the ”5 in 5” impact society in one or the other way.

At IBM, we use this to direct future focus for research which also drives a long term view on investments. The same needs to be done for Defense & Intelligence organizations.

Imagine a Defense & Intelligence organization that delivers ...

Outstanding Mission Outcomes
across critical domains

Defense platforms



Logistics

Cyber Security

"Open" Source
Intelligence

Command, Control
and Communications

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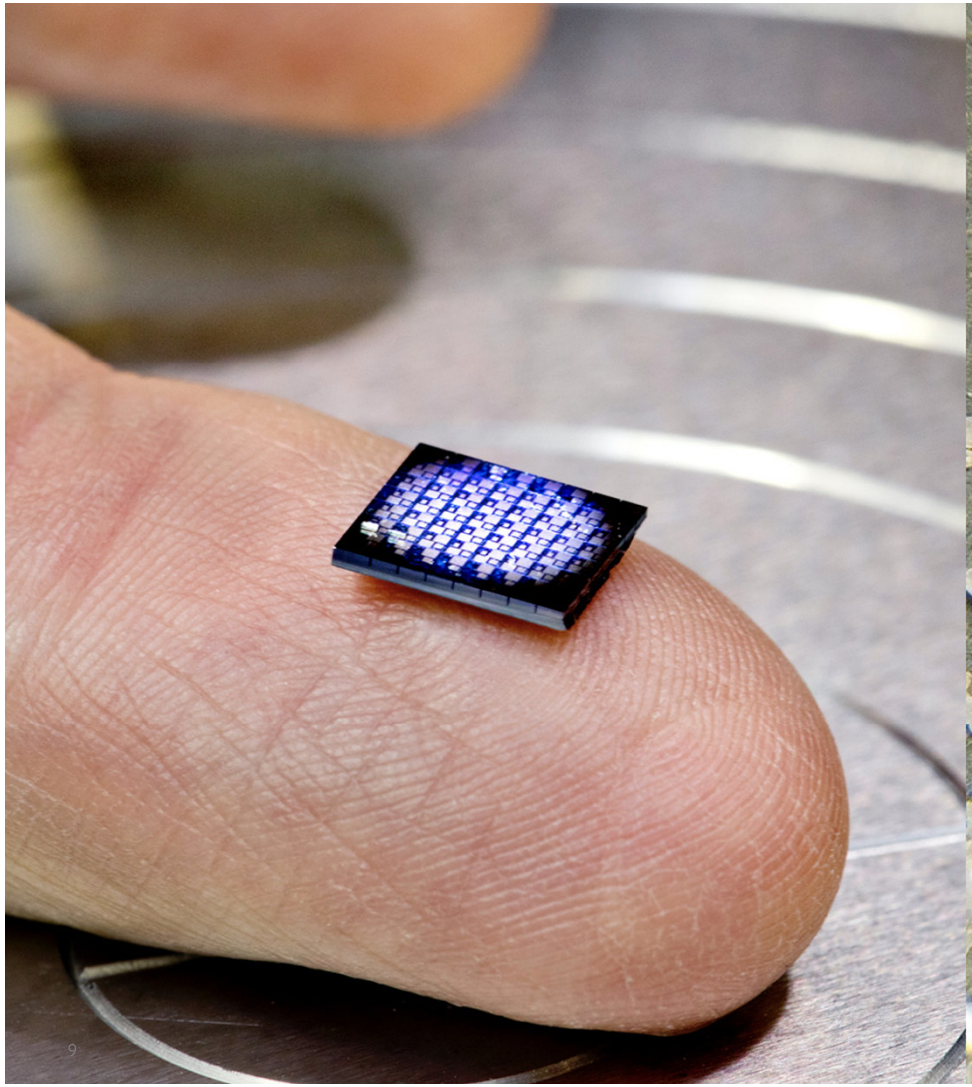
Defense and Intelligence agencies face an array of challenges and technology constraints

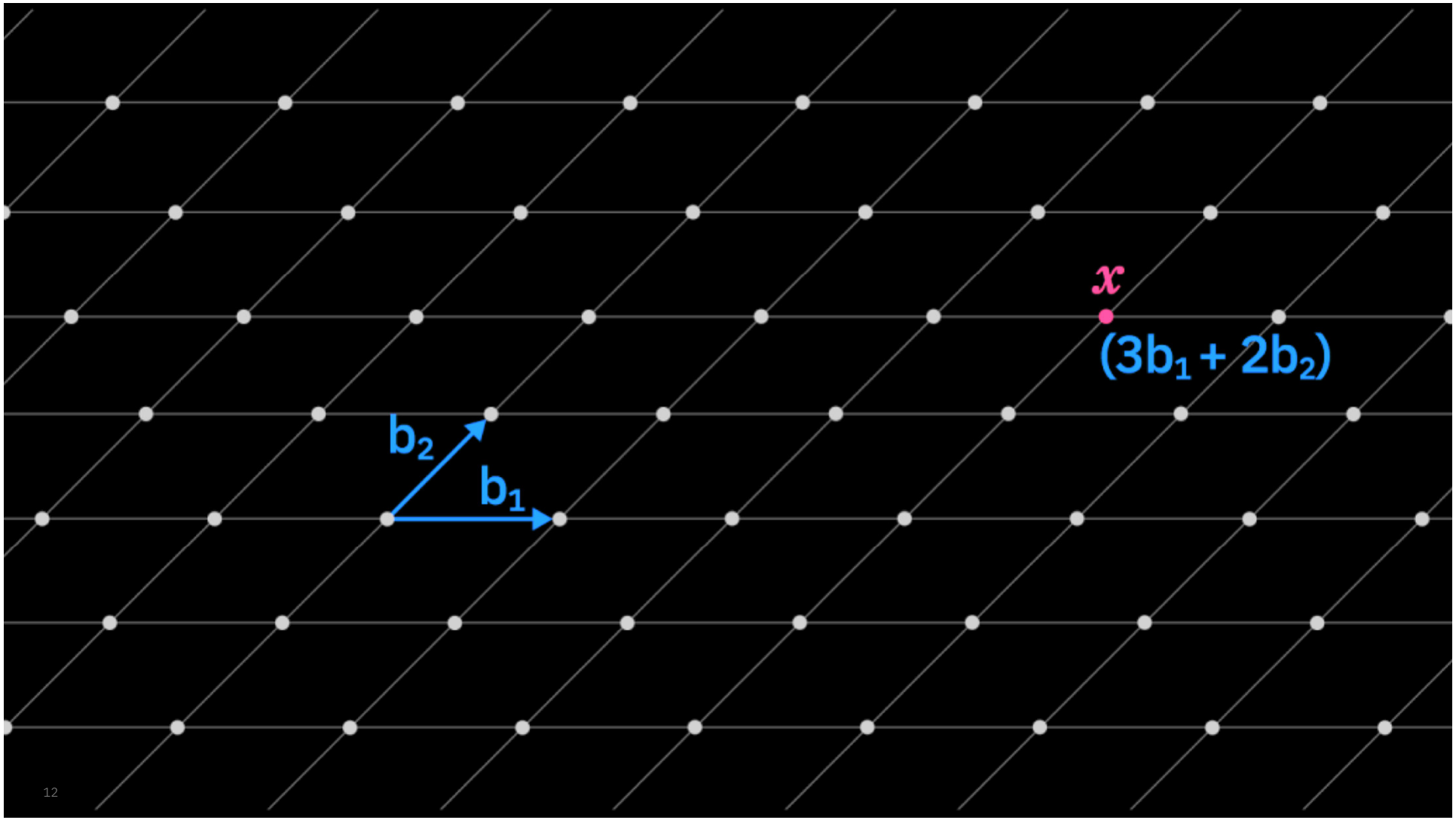
Nobody likes knockoffs. Crypto-anchors and blockchain will unite against counterfeiters.

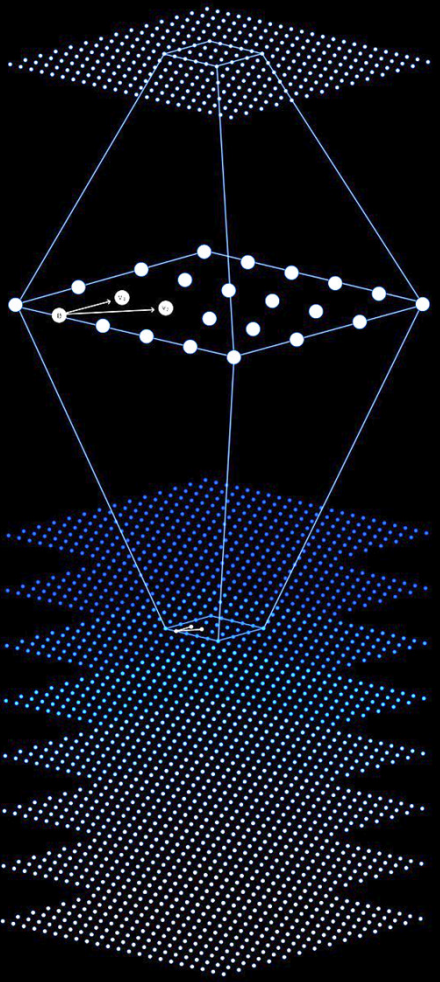


… and its Applicability in Defense & Intelligence

- Guaranteed provenance of spare parts management to improve service delivery time, quality and cost.
- Establish a distributed management system to know location, configuration and readiness status of all your assets.
- Operate on a cost effective, flexible and mobile modern infrastructure, from headquarters to deployed, trusted across a network of organizations.
- Establish a safe and fair method to take care of the displaced and paperless and preventing the infiltration of individuals who are known security threats.
- Improve co-operation between multiple parties to allow for seamless joint operations.

Hackers gonna hack. Until they encounter lattice cryptography.

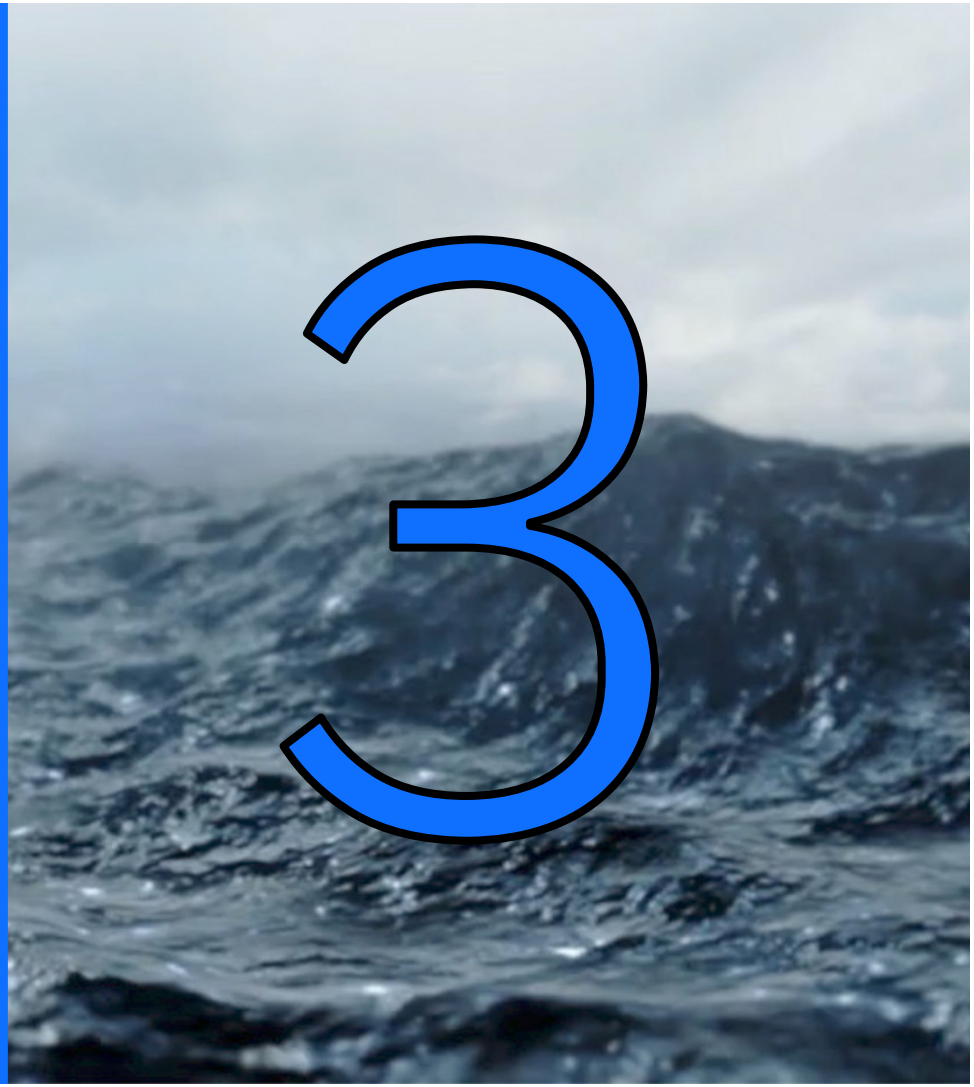

x
(3b1 + 2b2)
b2
b1

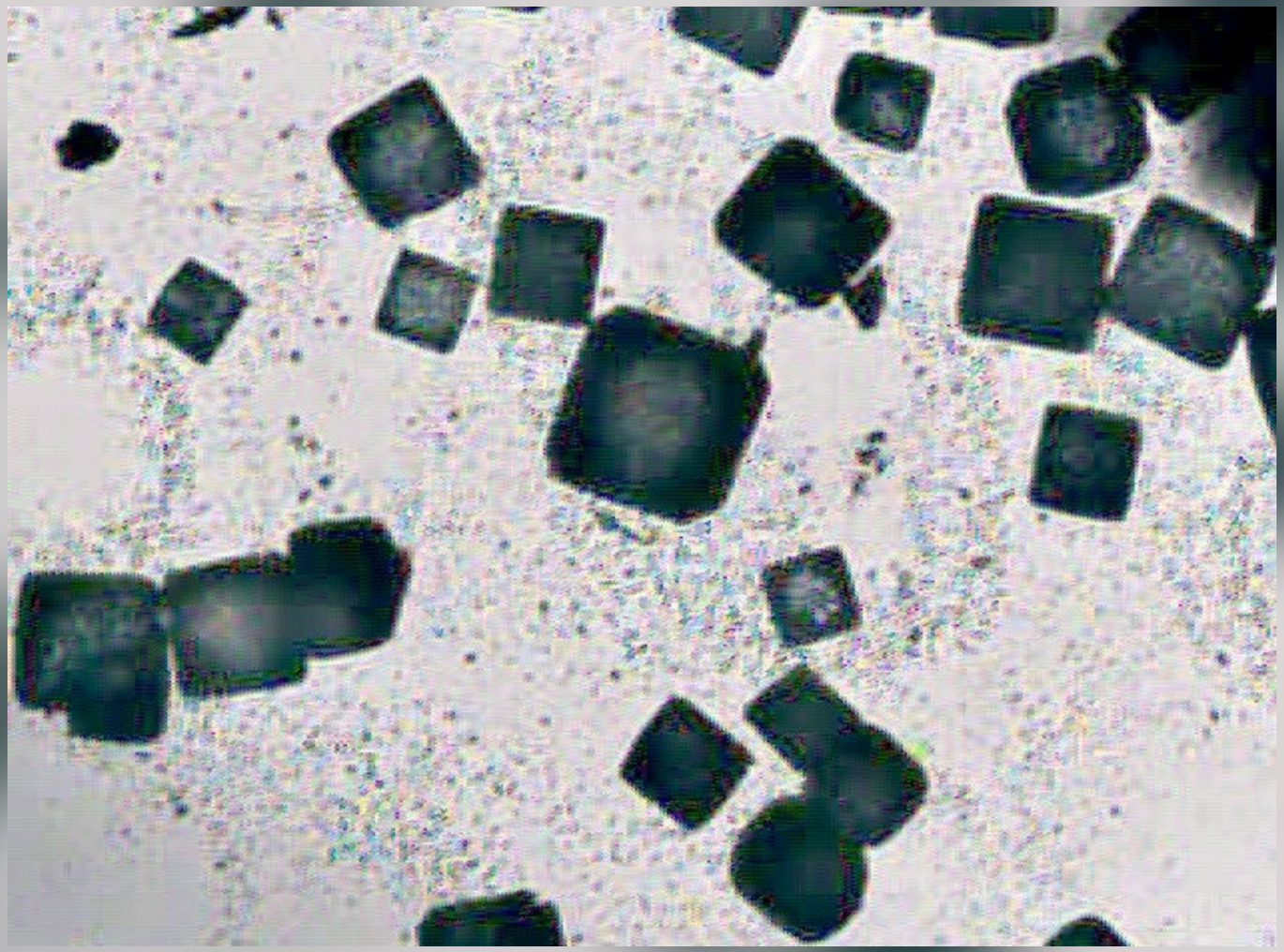


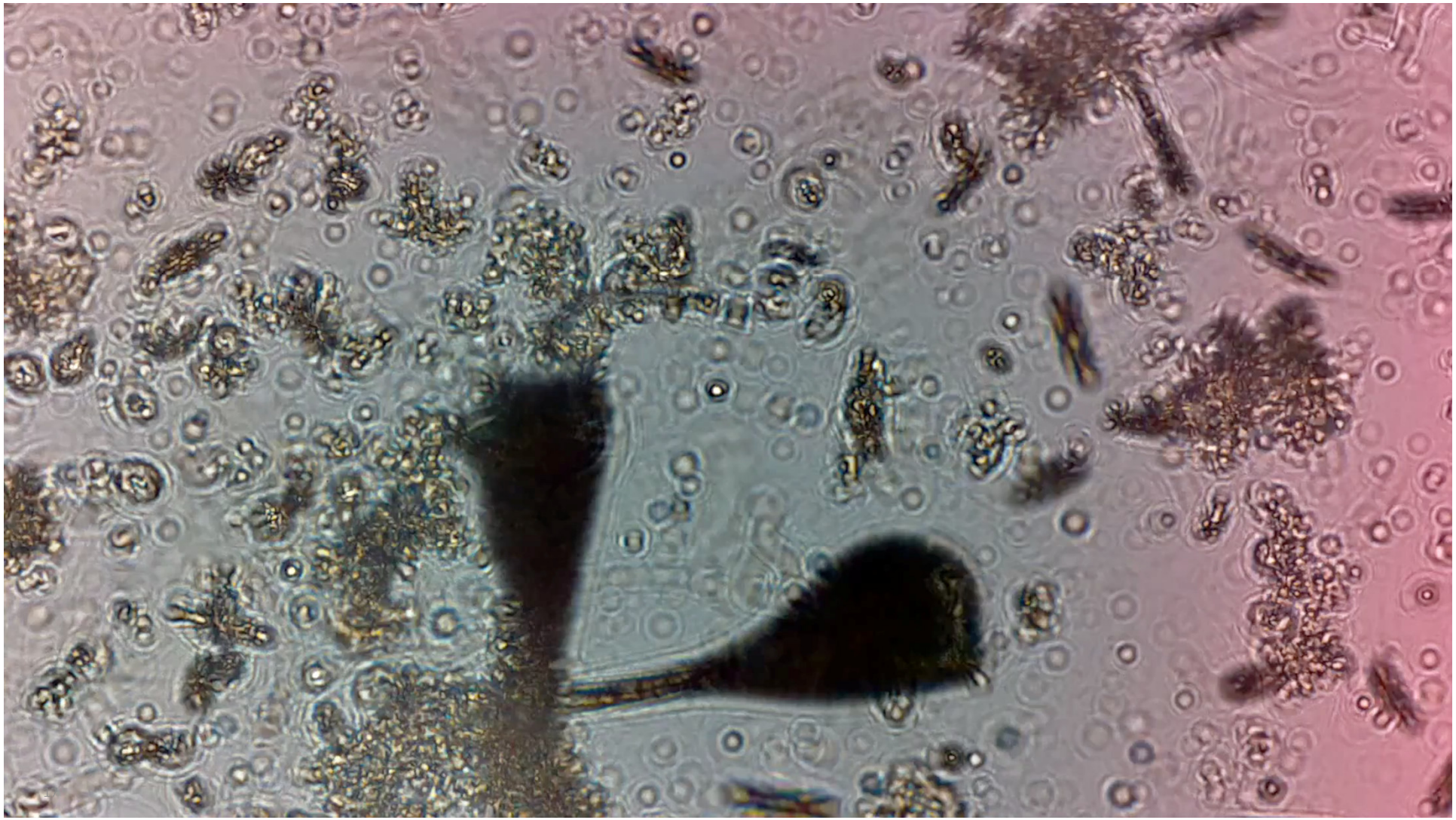
… and its Applicability in Defense & Intelligence

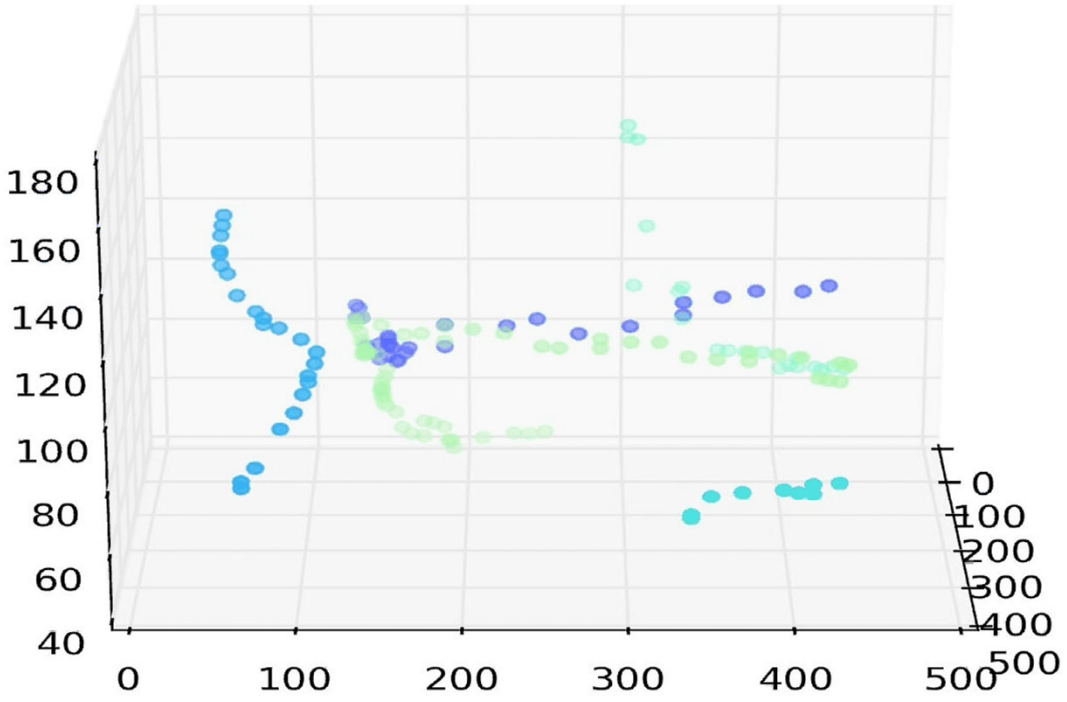
- While the first Quantum decryption algorithms are still a few years away, changing the encryption of large and possibly distributed archives is costly and time consuming.
- New encryption methods will have to be deployed and used across the whole network of allies.
- Encryption has to fit with an overall concept against cyber threats.

Our oceans are dirty. AI-powered robot microscopes may save them.








180
160
140
120
100
80
60
40
0
100
200
300
400
500
0
100
200
300
400
500

… and its Applicability in Defense & Intelligence

- Real time monitoring of critical resources such as water but also air to predict various threats.
- Deployment of AI enabled sensors, which are autonomous and durable into the field for surveillance and reconaissance

AI bias will explode. But only the unbiased AI will survive.


Automation bias
Attentional bias
Continued influence effect
The tendency to believe previously learned misinformation even after it has been corrected. Misinformation can still influence inferences one generates after a correction has occurred.
Stereotyping
Backfire effect
Duration neglect
The neglect of the duration of an episode in determining its value
Egocentric bias
Third-person effect
Choice-supportive bi
The tendency to remember
Mere exposure effect
The tendency to express undue liking for things merely because of familiarity with them.
Denomination effect
Cross-race effect
The tendency for people of one race to have dfificulty identifying members of a race other than their own.

… and its Applicability in Defense & Intelligence

- AI systems and algorithms will become widely used in Defense & Intelligence scenarios. E.g.: bias can lead to wrong situation assessments.
- Applications for AI: Scenario planning, command support, information analysis, social media analysis, face and vision analysis, video stream analysis
  – for all those applications it’s critical to develop and train these systems with data that is fair, interpretable and free of racial, gender, or ideological biases.

Today, quantum computing is a researcher’s playground. In five years, it will be mainstream.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IBM Quantum Computing
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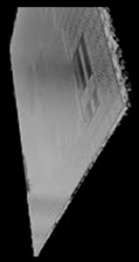
… and its Applicability in Defense & Intelligence

- Possible applications for Quantum Computing are Complex Simulations, Code Decryption, Systems Analysis, Material Science, Supply Chain & Logistics, Machine Learning – all highly relevant for Defense & Intelligence.
- Quantum Computers will eventually surpass the capabilities of classical computers for specific problems.

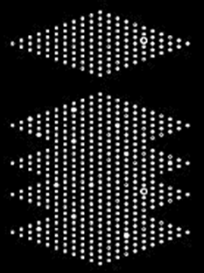
5 in 5

Five innovations that will help change our lives within five years

1 - Nobody likes knockoffs. Crypto-anchors and blockchain will unite against counterfeiters.



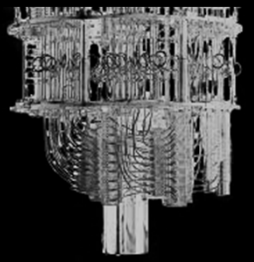
2 - Hackers gonna hack. Until they encounter lattice cryptography.



3 - Our oceans are dirty. AI-powered robot microscopes may save them.

4 - AI bias will explode. But only the unbiased AI will survive.

5 - Today, quantum computing is a researcher's playground. In five years, it will be mainstream.



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Additional resources

Changing the way the world works: IBM Research's "5 in 5"
Blog by Arvind Krishna, Head of IBM Research
https://www.ibm.com/blogs/research/2018/03/ibm-research-5-in-5-2018/

IBM Research 5 in 5 website
https://www.research.ibm.com/5-in-5/

5 in 5 video playlist
https://bit.ly/2GtPOwZ

5 in 5 Science Slam at Think 2018
https://www.ibm.com/events/think/watch/replay/113720903/