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1-25-2023

Increasing Drought Conditions Threaten Utah High-Tech Data Center Cooling Systems

Ella Devey
Utah State University

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Recommended Citation

Devey, Ella, "Increasing Drought Conditions Threaten Utah High-Tech Data Center Cooling Systems" (2023). *Research on Capitol Hill*. Paper 132.
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Utah's water sources are **reducing in flow**, jeopardizing a critical component of **Utah's economy**.



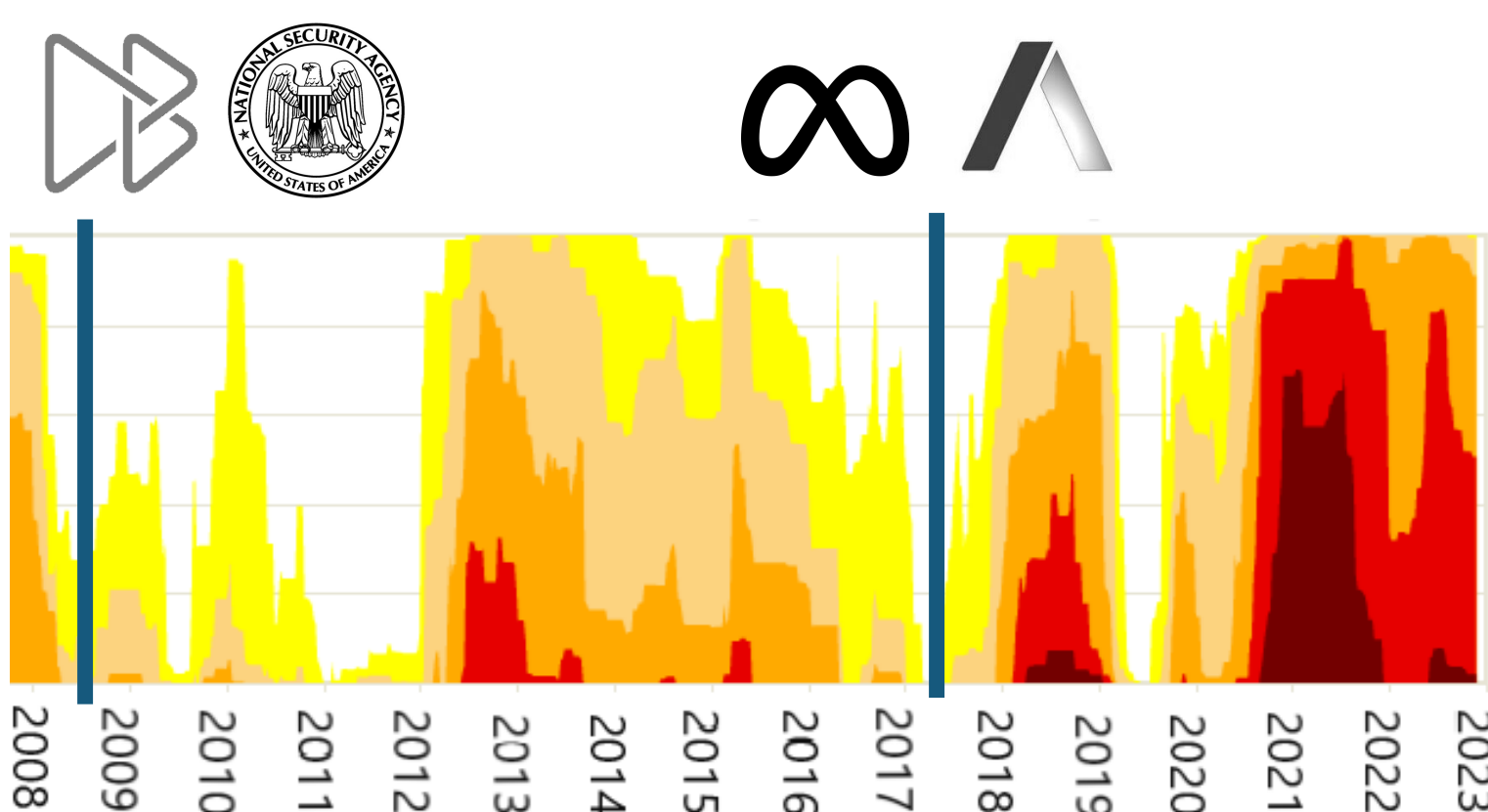
Ella Devey
Utah State University
Jeannie Johnson
Briana Bowen
Utah State University

I am a student in USU's Center for Anticipatory Intelligence, a program heading interdisciplinary research methods for a range of emerging security challenges.

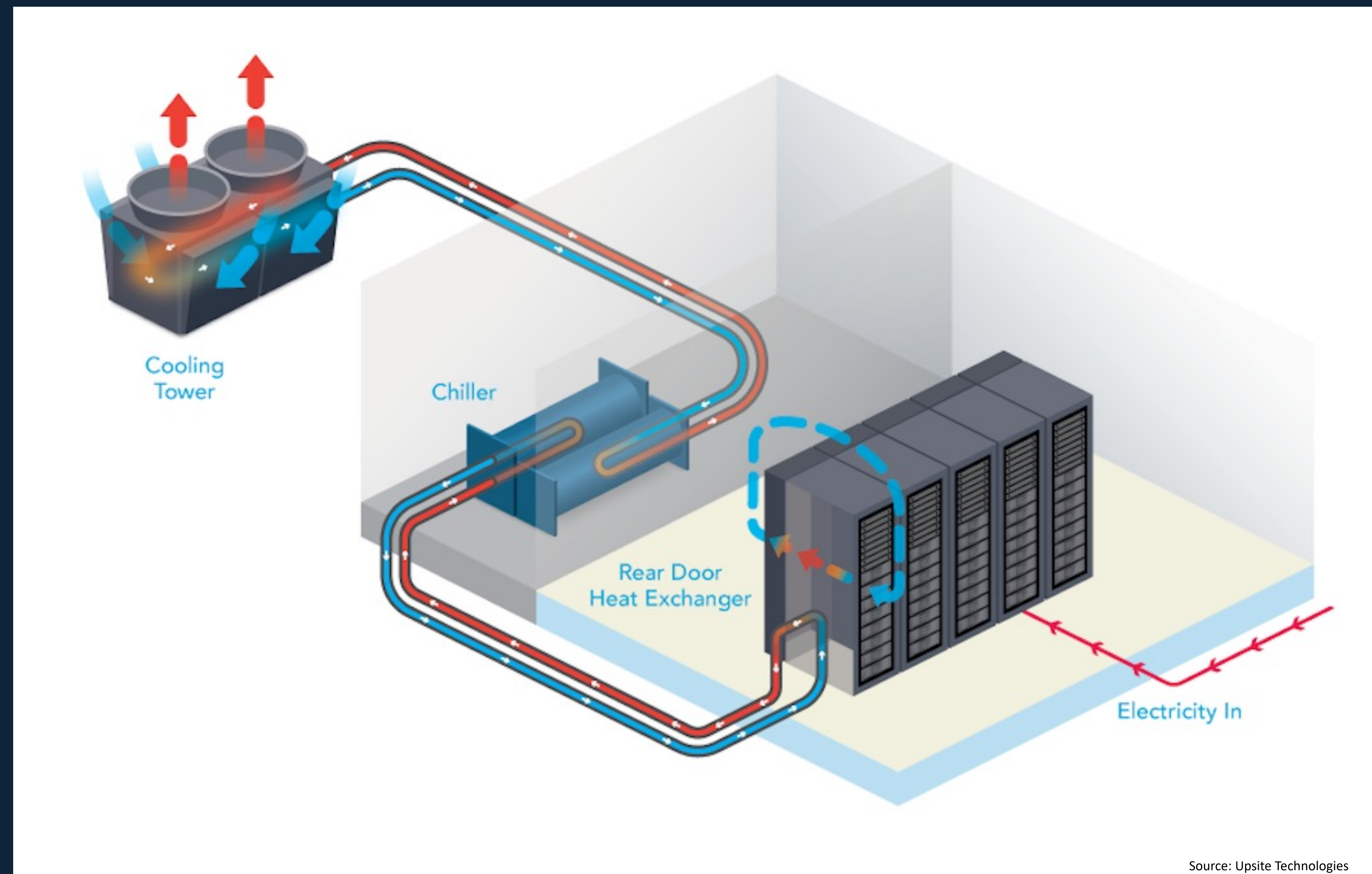
Data center threats

Utah's public and private data centers provide digital storage for medical, infrastructure, media, and national security purposes. Data centers harness the high thermal conductivity of water to remove heat from computers and hardware, preventing them from **melting or becoming damaged**. If drought conditions become more severe, **Utah's data centers may become unable to operate** at necessary capacity, damaging Utah's economy and security.

Utah's largest data centers were planned in times of low drought.



Increasing **drought conditions** threaten Utah high-tech **data center cooling** systems.



A cornerstone of Utah's Silicon Slopes and growing tech economy faces unprecedented pressure from drought.

Data center resilience

The **4R framework** measures resistance to threats, retention of function during threats, recovery of full operation after threats, and post-threat resurgence to assess the resilience of a system.



Though data centers cannot prevent drought, they work to **RESIST** harms by implementing water-efficient technologies.



RETENTION of function during drought is inhibited by cooling water from a single location.



RECOVERY after drought is dependent upon individual and collective data center contingency planning.



RESURGENCE is enhanced when data centers allow for easy hardware upgrades over time.

Recommendations

Promote public and private research partnerships to develop efficient technology.



Allow new Utah data center construction only if long-term resource projections and efficiency allow.



Prepare emergency operations plans to prepare for severe, water-restricting droughts.

