ZUTACORE®

ACADEMIA & RESEARCH
AS HEARD ON DCD'S BROADCAST · *KEEPING IT COOL*

OREGON STATE UNIVERSITY · COLLEGE OF EARTH, OCEAN, AND ATMOSPHERIC SCIENCES

Retrofitted In-House. Zero Servers Replaced.

Speaking on DCD's *Keeping It Cool* broadcast, Chris Sullivan described how Oregon State's College of Earth, Ocean, and Atmospheric Sciences met a hard power ceiling — and 240 additional tons of projected cooling load — by retrofitting the servers it already owned with ZutaCore® HyperCool® waterless two-phase direct-to-chip cooling, rather than buying new compute.

20%
IMPROVEMENT IN COMPUTE PERFORMANCE

300 kVA
RECLAIMED — FOUR CRAC UNITS NO LONGER NEEDED

15–20 min
PER-SERVER RETROFIT, INSTALLED BY IN-HOUSE STAFF

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SERVERS REPLACED — EXISTING DELL, HP & SUPERMICRO KEPT

Why the Alternatives Were Ruled Out

More Air Cooling
70 tons of cooling already in place, with another 240 projected. Each CRAC unit drew 75 kVA — power that would never reach a processor — and fans still throttled the silicon.

Immersion
Capable, but it meant replacing hardware bought with grant funding. With a small field of vendors, it read as high-risk for an investment expected to last 10–15 years.

Single-Phase Water
Plenty of options, but site visits turned up water on the floor — plus pump loads and manifold complexity that campus facilities were reluctant to take on.

The Questions Every Operator Asks

Answered by Chris Sullivan on the DCD broadcast, with figures verified against the Oregon State University case study.

THE QUESTION	WHAT OREGON STATE UNIVERSITY FOUND
"We can't afford to replace our compute."	OSU retrofitted its existing Dell, HP and Supermicro servers using the **ZutaCore HyperCool solution**, which works with the racks, processors and chilled water systems already on campus. That hardware was bought with grant money that cannot be spent twice, so the budget went into the data center rather than replacement compute.
"We don't have the staff for specialist installers."	In-house technicians did the work: **15–20 minutes per machine**, every unit checking out first time. The team later disconnected and relocated racks room-to-room unaided.
"Facilities will never sign this off."	Competing designs stalled on manifold and flow-rate complexity. This one came down to **two hoses and low flow rates** — *"Two hoses. We're great. Where do you want those?"*
"We can't take the data center down."	The retrofit ran **without an outage**, while the $220M Ocean Observatory Initiative streamed minute-level data continuously. First conversation to fully deployed data center: **about one year**.
"Is the performance gain real?"	CPU temperatures fell from roughly **72°C to 66°C** — up to 30% lower processor temperatures, **20% better compute performance**, no thermal throttling, and longer component life.
"What about noise and the people on site?"	With heat removed at the silicon, server fans wind down. A full rack ran **~12 months inside an occupied lab** at full performance without a single noise complaint.
"What happens to the heat?"	It becomes an asset. Captured heat is **redirected to warm nearby buildings**, feeding OSU's wider sustainability commitments rather than being rejected to atmosphere.

> **"This has allowed our group to take power that was going to be used for additional air based CRAC units and translate that into processing power for servers, increasing our overall capacity with the same space."**
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> CHRISTOPHER M. SULLIVAN · DIRECTOR, RESEARCH AND ACADEMIC COMPUTING · COLLEGE OF EARTH, OCEAN, AND ATMOSPHERIC SCIENCES

Retrofit the Estate You Already Own.

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Watch the full DCD *Keeping It Cool* broadcast →

ZutaCore · 950 Tower Lane, Suite #120, Foster City, CA 94404 · info@zutacore.com

Primary source: Chris Sullivan, Oregon State University, speaking with Alison Dean, ZutaCore, on DCD's *Keeping It Cool* broadcast. Figures verified against the ZutaCore and Oregon State University case study.