2025 ANNUAL REPORT

UC San Diego

CENTER FOR HEALTHCARE CYBERSECURITY

LETTER FROM THE CO-DIRECTORS

Dear Colleagues, Partners, and Supporters,

As we come to the end of a successful second year for the UC San Diego Center for Healthcare Cybersecurity (CHC), we are grateful for the opportunity to reflect and share the accomplishments and milestones our team and this awesome community achieved. We will highlight accomplishments across four priority domains: research, education, innovation, and non-partisan advocacy.

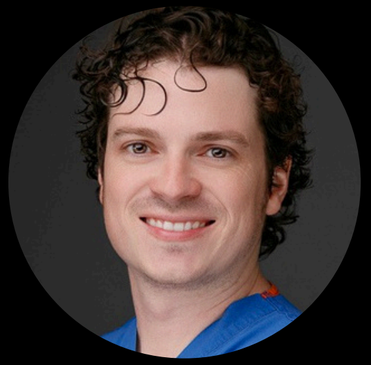
From publishing a landmark study on the effectiveness of phishing training to launching a free, open-source repository of clinical harms and analyzing patient impacts following the CrowdStrike technology failure, CHC continues to deliver high-impact, peer-reviewed research powered by its deep clinical and technical expertise.

We are proud to see CHC work presented by fellows, Ph.D. students, and undergraduate students at conferences and seminars across the globe, from London to Tokyo to Hawaii. We are building the future healthcare cybersecurity research and operational workforce, and we are delighted to tell you that we are producing the best talent in this space.

We are grateful for our first two industry partners, Johnson & Johnson MedTech and BD for their support and look forward to tackling shared challenges within the medical device cybersecurity domain in the coming year.

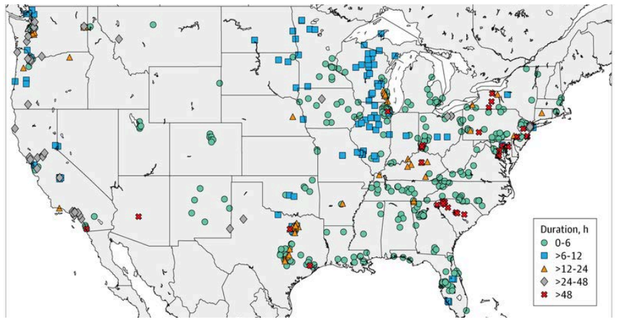
In the following pages we'll share more of what we've achieved together. We thank you for your support to our shared mission of cyber-resilient healthcare and wish you and your families a healthy and prosperous 2026.

Christian Dameff, M.D.



Jeff Tully, M.D.

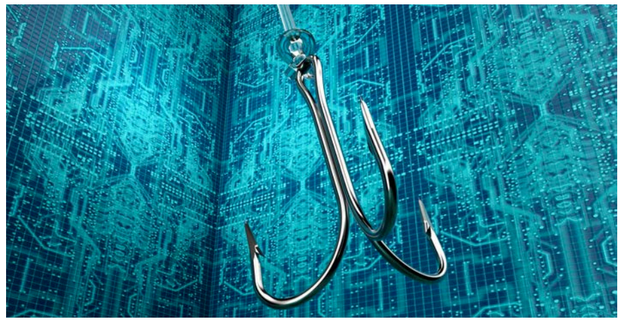
FEATURED PUBLICATIONS



Patient Care Technology Disruptions Associated With the CrowdStrike Outage

SCAN BELOW

OR CLICK TO READ THE PAPER



Understanding the Efficacy of Phishing Training in Practice

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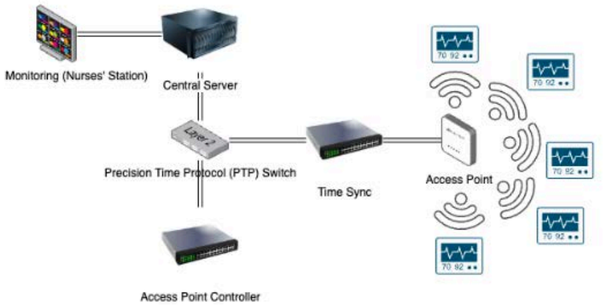

CRASHCART: Truckin' in a Backup System to Revive Hospitals During Computer Outages

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OR CLICK TO READ THE PAPER

INDUSTRY PARTNERS

Johnson&Johnson MedTech

“This collaboration is a key step in advancing the security of our medical devices and healthcare systems, especially in light of increasing cybersecurity threats and heightened regulatory requirements. As a medical device manufacturer, Johnson & Johnson MedTech is committed to addressing vital challenges in healthcare cybersecurity, including workforce education and secure design practices. By partnering with UC San Diego, we are excited to continue to innovate and develop solutions that not only protect patient data but also strengthen the resilience of our healthcare infrastructure against evolving cyber threats.”

– Ashley Mancuso, **VP, BISO and Product Security, Johnson & Johnson MedTech**

BD

“BD is proud to collaborate with the UC San Diego Center for Healthcare Cybersecurity to advance clinical cyber resilience and strengthen alignment between those who develop and safeguard medical technologies and the healthcare professionals and patients who depend on them.

This partnership supports innovation that is both secure and attuned to the realities of frontline care—resulting in technologies that truly meet the needs of those delivering and receiving care in today’s complex cybersecurity environment.”

– Nimi Ocholi, **Vice President, Research and Development, Product Security**

ADVOCACY

CHC Co-Director Dr. Christian Dameff testified before the U.S. House Energy & Commerce Committee's Subcommittee on Oversight & Investigations on cybersecurity vulnerabilities in legacy medical devices. Drawing on his dual perspective as a frontline clinician and security researcher, he described how aging, often unpatchable devices, combined with under-resourced healthcare environments, create real patient-safety risk and make rapid remediation difficult.

SCAN OR CLICK HERE TO VIEW THE FULL HEARING

STUDENT SPOTLIGHTS

Almog Bar-Yossef
Undergraduate Student

Research: Emergency hospital replacement network

“Joining CRASHCART has transformed how I understand the software and hardware security of healthcare digital infrastructure. Working alongside UC San Diego clinicians and CSE faculty has shown me how to apply my engineering skills to strengthening hospital resilience against ransomware. From deploying the CRASHCART network at Arlington for government and industry stakeholders to presenting our team’s first paper at ACSAC’s HealthSec workshop in Honolulu, I’ve seen the real-world impact of our research and I’m motivated to pursue a PhD in computer security focused on protecting critical infrastructure.”
-Almog Bar-Yossef

Seoyoung Kweon
Ph.D. Student

Research: Qualitative, social media–derived ransomware data

“Working on this project allowed me to confront the real-world consequences of hospital outages on patients and uncover recurring patterns of systemic weaknesses in healthcare infrastructure. As an early-stage Ph.D. student, I also developed a stronger understanding of internet measurement research and its significance for empirical security research.” -Seoyoung Kweon

WATCH THE VIDEO: SCAN THE QR CODE OR CLICK THE LINK TO READ PATIENT AND PROVIDER DESCRIPTIONS OF THEIR EXPERIENCES NAVIGATING RANSOMWARE-RELATED CARE DISRUPTIONS.

Viewer Advisory: This video includes graphic language and may not be appropriate for all audiences.

STUDENT RESEARCHERS

CHC’s students are core contributors to our research, prototypes, and publications, bringing technical rigor and fresh thinking to healthcare cyber resilience.

ALMOG BAR-YOSSEF

ALEX BELLON

PAUL CHUNG

HENRY FENG

ALEX GAO

MICHELINA HANLON

KATHERINE IZHIKEVICH

EILEEN KIM, M.D.

SEOYOUNG KWEON

ELISA LUO

TYLER POTYONDY

ZACH POPE, M.D.

SUMANTH RAO

YE SHU

FACULTY HONORS

CHRISTIAN DAMEFF, M.D.
Selected as a 2025–2027 National Academy of Medicine ABEM Emergency Medicine Fellow

DEEPAK KUMAR, PH.D.
Playwright of House of India, which premiered at The Old Globe in 2025 (world premiere production)

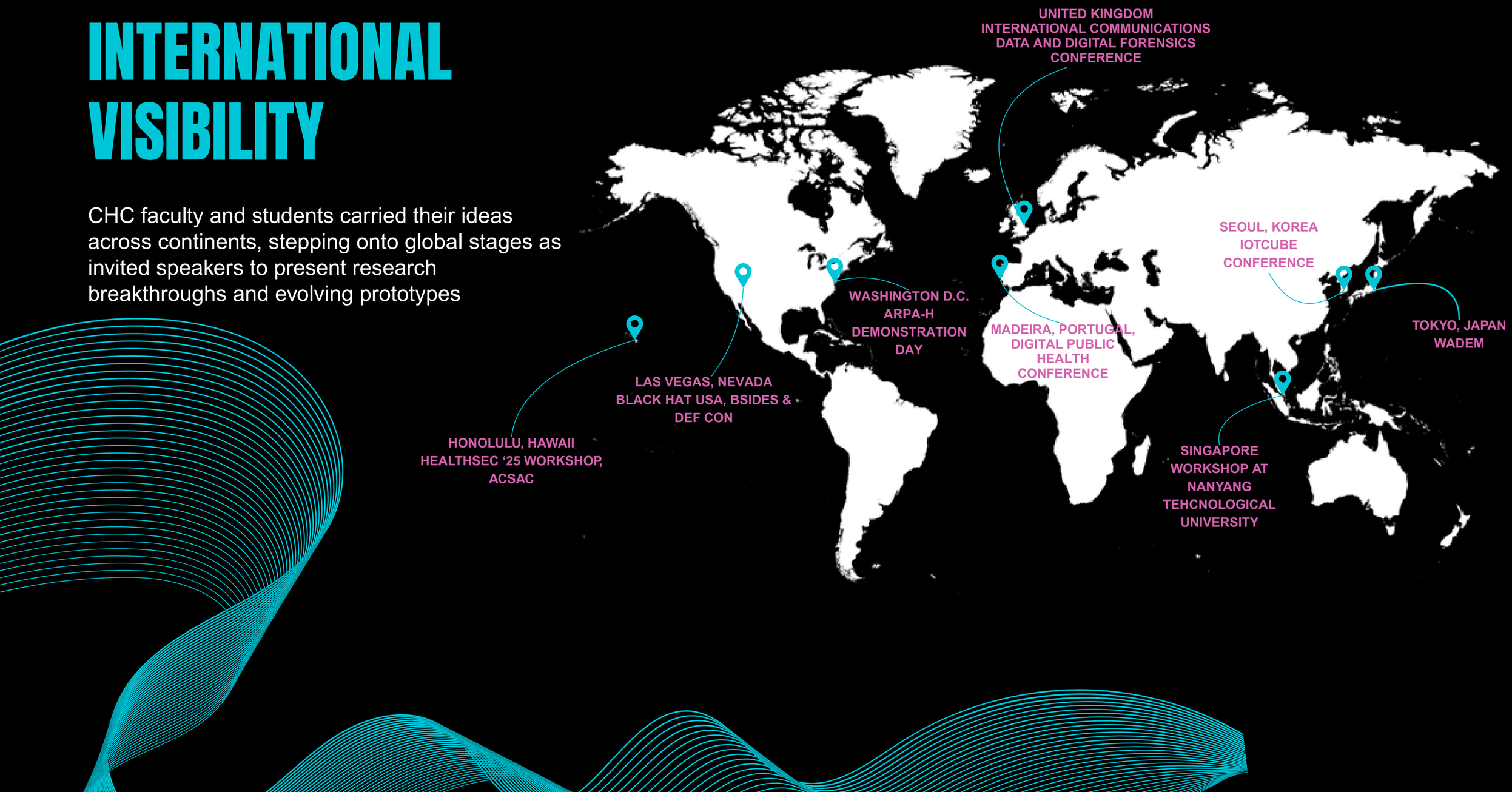
STEFAN SAVAGE, PH.D.
Recipient of the 2025 USENIX Security Test of Time Award for long-term impact in security research

AARON SCHULMAN, PH.D.
Earned an ACM CCS 2025 Distinguished Paper Award for research on satellite communications exposures

JEFF TULLY, M.D.
Received the 2025 AAMI & MedCrypt Cybersecurity Visionary Award for leadership in medical device cybersecurity

INTERNATIONAL VISIBILITY

CHC faculty and students carried their ideas across continents, stepping onto global stages as invited speakers to present research breakthroughs and evolving prototypes



CHC IN DC

Our CHC team traveled to Washington, D.C. for an ARPA-H demonstration day with PARADIGM, a program focused on mobile platforms that bring advanced medical services outside traditional hospitals.

We showcased our full CRASHCART prototype, demonstrating a deployable “hospital-IT-system-in-a-box” designed to keep clinical operations running during ransomware or major technology failures.

DEF CON

CHC attended DEF CON 2025 to bring healthcare cybersecurity research directly to the global security community and build new collaborations around patient safety and resilience. We were represented at the Biohacking Village, where Dr. Isabel Straw presented CIPHER (see next page), an open-source platform and “CIPHER Cube” model that connects cyber incidents (like outages and ransomware) to real-world clinical harms across specialties using case studies and social data.

INNOVATIVE RESEARCH

For more than a decade, healthcare and cybersecurity researchers have asked a critical question: How can we quantify the real-world risk of patient harm from hospital cyberattacks?

To help address this gap, Dr. Isabel (Izzy) Straw leads the development of CIPHER (Cyberattack Impact, Patient Harms, and Emergency Response) at the UC San Diego Center for Healthcare Cybersecurity. CIPHER is an open-source platform that models cyberattack impacts, patient harms, and emergency response.

CIPHER documents care disruptions, injuries, and deaths linked to hospital cyber incidents using frontline narratives from clinicians, patients, and families, and combines them with global incident data to visualize how disruption spreads from the first hour of an attack to the weeks that follow.

Across reported incidents, CIPHER has identified harms including:

- Missed tumor recurrences and deaths among cancer patients
- Delays in treating blood clots and brain bleeds in emergency settings
- Door access failures that hinder delivery of time-critical care
- Ward alarms and telemetry interruptions that disrupt patient and fetal monitoring
- Network-connected refrigeration failures affecting blood and specimen products
- Interruptions in access to contraception, miscarriage care, mental health medication, and end-of-life comfort care in the community

Developed through the Center in collaboration with UC San Diego colleagues across cybersecurity, clinical, and operational domains, CIPHER advances the Center's broader work in cyber-clinical preparedness and hospital resilience. We are continuing to build CIPHER with healthcare organizations, researchers, and policymakers to strengthen cyber resilience across hospitals and health systems.

Dr. Isabel (Izzy) Straw is a visiting research fellow at the UC San Diego Center for Healthcare Cybersecurity whose work focuses on making the real-world patient safety impacts of cyber incidents visible, measurable, and actionable. A practicing emergency physician with a Ph.D. in AI, she leads the development of CIPHER. Her work bridges frontline clinical narratives with rigorous analysis to help health systems, researchers, and policymakers strengthen cyber-clinical preparedness and resilience.

EXPLORE THE CIPHER PLATFORM
https://www.thecipherplatform.com/home

SCAN OR CLICK TO VIEW CIPHER EXPLAINER VIDEO

ACADEMIC SYMPOSIUM 2025

CHC convened leaders in healthcare cybersecurity for a two-day, in-person symposium featuring research talks, practical resilience discussions, and community building across academia, industry, and government. The program showcased CHC faculty and hosted some of the first public presentations from ARPA-H DIGIHEALS performer teams, highlighting emerging approaches to securing and sustaining care during technology disruptions.


BAY I

ACADEMIC SYMPOSIUM 2025

HIGHLIGHTS FROM ATTENDEES

“As always, the simulation was a high point. I also really appreciated the variety of voices, from government to science to patients. I also appreciated the mix of excellent recurring speakers and new voices.”

“I really appreciated the variety of voices, especially the patient voice (both from Andrea and from the Reddit posts), and Josh's step back to the wider interconnectivity of the ecosystem.”

“The physician exercise is always eye-opening. A reminder that the primary purpose is patient care and not cyber is a great perspective to rinse and repeat.”

“This was a fantastic event, going well beyond my expectations (which were already quite high). Please please please keep it up.”

SHAPING HEALTHCARE IN 2026

Exciting New Institutional Partnerships to Be Announced
Collaborations with industry partners will accelerate research and innovation for the next generation of secure medical device engineering

Release of the TOME v1.0
An evolution in clinical and business continuity downtime procedures

CHC's First Student-Led Hackathon
Showcasing our accomplished talent pipeline in the best of old school hacking traditions

Save the Date: October 26 – 28 Academic Symposium 2026

UC San Diego
CENTER FOR HEALTHCARE CYBERSECURITY

EXPLORE OUR WORK AND BECOME A MEMBER

CHC Website

Our website, cyberhealth.ucsd.edu, is the primary hub for the Center for Healthcare Cybersecurity. Visitors can explore our research portfolio, read project summaries and publications, find news and media coverage, and learn how CHC brings together academia, industry, and government to advance healthcare cyber resilience.

CHC Membership

CHC Membership offers industry partners a clear, meaningful way to engage with the Center's mission. Members benefit from structured access to CHC leadership and researchers, timely insight into priority initiatives, and participation in a trusted community dedicated to evidence-based collaboration. We invite you to join CHC and advance healthcare cyber resilience together.
https://cyberhealth.ucsd.edu/membership/index.html