

# CYBER **HIVE** NEWSLETTER

*July 2024 - June 2025*



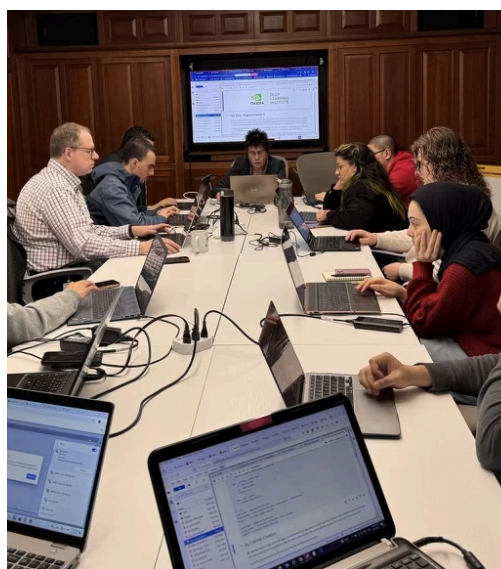
## A Year in Review



[www.hivehub.org](http://www.hivehub.org)

### HIVE Leaders Drive AI and Cybersecurity Innovation at CAE Community Symposium

On **April 8th, 2025**, the CAE in Cybersecurity Community Symposium brought together national leaders to advance cybersecurity education and workforce development. Representing the University of Louisville, Dr. Adel Elmaghraby, Dr. Andrew Wright, and Dr. Adrian Lauf contributed expertise in AI, cybersecurity systems, and interdisciplinary innovation. Their participation included key discussions on integrating AI into cybersecurity curricula and strengthening cross-sector collaboration. Hive AI Innovation Studio is proud to support their ongoing efforts to build forward-thinking, inclusive, and impactful solutions at the intersection of AI and security. The symposium also celebrated their team's achievements in outreach, including recognition for the CyberSkills2Work curriculum.



### Workshop: Fundamentals of Deep Learning – Cybersecurity

On **April 5th, 2025**, Hive AI Innovation Studio hosted an intensive workshop led by Dr. Mariofanna Milanova, bringing together students and professionals to explore deep learning in cybersecurity. Participants gained hands-on experience using PyTorch and cloud-based GPU environments, applying AI models to real-world challenges like threat detection. Every attendee earned an official NVIDIA DLI certificate, including HIVE members, marking a successful step toward shaping the future of AI-driven security.



# A Year in Review



## Combating Trafficking in Persons – IVLP Delegation Visit

On **February 17<sup>th</sup>**, Hive AI Innovation Studio was honored to host a delegation from the U.S. Department of State's International Visitor Leadership Program (IVLP), in collaboration with the World Affairs Council of Kentucky & Southern Indiana, for an initiative titled "Combating Trafficking in Persons: A Project for Africa." The event convened African leaders and human rights advocates committed to addressing the global challenge of human trafficking.

Participants explored how emerging technologies—particularly AI and cybersecurity—can support legal frameworks and strengthen anti-trafficking initiatives. Professor Michael Losavio, an expert in criminal justice and legal informatics, offered insights on how technology can be integrated with legal strategies to enhance international response efforts. The event emphasized the importance of global cooperation, ethical innovation, and data-driven approaches in protecting vulnerable communities.

## International Delegations Explore AI-Driven Cybersecurity at Hive

On **August 1st**, Hive AI Innovation Studio proudly hosted a cybersecurity delegation from Cyprus, followed by a visit from a Romanian delegation on **October 2nd**—both highlighting Hive's leadership in advanced cybersecurity research. During the August visit, the Cypriot delegation explored AI-powered threat mitigation, real-time malware analysis, and predictive defense techniques. In October, the Romanian delegation focused on innovations in industrial control system (ICS) security and Hive's cutting-edge use of large language models (LLMs) for vulnerability detection.



Both visits celebrated Hive's global impact and commitment to collaborative cybersecurity education, reinforcing its role as a hub for international innovation and digital resilience.





# Cyber HIVE Opportunities

## MEDIA COVERAGE & RESEARCH OPPURTUNITIES

The Cyber HIVE team has been featured in numerous talks, research papers, and interviews, sharing insights on the studio's innovations and contributions to the field of AI. Notable members include Dr. Adel Elmaghraby, Mona Ebadi Jalal, Omar S. Emam, Cristián Castillo-Olea, and Begoña García-Zapirain. Through these engagements, Cyber HIVE continues to bridge the gap between technology and sectors such as healthcare and professional industries, offering valuable perspectives and advancing interdisciplinary collaboration.



who played a key role in laying the groundwork for HIVE's website. These global collaborations enrich the learning environment and reflect Hive's commitment to cultivating a diverse and future-focused tech community.

## INTERNSHIP PROGRAM

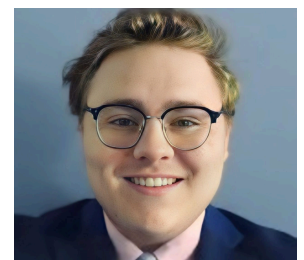
Cyber HIVE welcomes students from high school to Ph.D. level, offering immersive, hands-on opportunities to explore fields like AI, cybersecurity, app development, and machine learning. Through partnerships such as SummerWorks and initiatives at the University of Louisville, even high school students gain early exposure to the tech industry. The internship program not only fosters technical skills but also helps participants build lasting professional networks.

Cyber HIVE also proudly hosts international interns each summer—last year welcoming two students from Egypt, and again this year, continuing that tradition with new international talent. In addition, during the fall, the studio was joined by Haitham Hazaymeh from Jordan,

## HIVE TESTIMONIALS

Team members at Cyber HIVE—including developers, interns, and engineers—have praised their experience, highlighting both the value of their work and the studio's influence on their career goals. Jacob, a computer science major and former intern, shared:

*"Working at HIVE has fueled my passion for data science and machine learning."*







**Omar Emam**

AI/Health Researcher at HIVE

## Background

MD graduate from Egypt, passionate about healthcare and innovation.

## Current Role at HIVE

AI & health researcher, working on cutting-edge applications of artificial intelligence in medical settings.

## Why He's Here

Omar joined HIVE to deepen his knowledge in AI and computer science as he prepares for his upcoming medical residency.

## His Mission

To bridge the gap between clinical care and technology—bringing doctors and data closer together.

## In His Words

“

*It's been an interesting journey learning about AI and computer science and trying to bridge the gap between medical care and computer science.*

## Why Artificial Intelligence?

Omar sees AI as a game-changing tool for modern medicine.

“

*I believe that AI is just a new tool that will transform the way doctors think about their clinical care and research in a lot of educational activities. If you're not gonna learn this tool, you'll be left behind.*

With the right knowledge, he believes doctors can unlock insights that were once impossible.

“

*Now that we have this tool in our hands, we will be able to uncover and discover a lot more.*

## What He's Working On

Omar is currently working on a project focused on Alzheimer's disease, one of the most common and devastating neurological conditions.

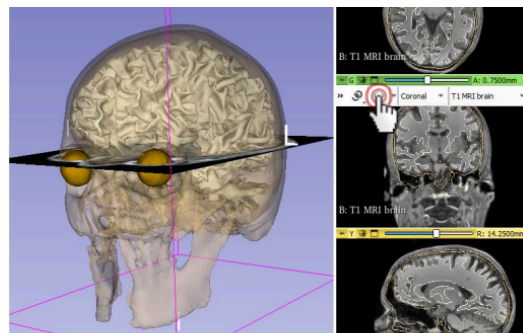
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*Usually the way it gets diagnosed is through clinical diagnosis, which happens very late in life.*

His goal is to use artificial intelligence to shift that timeline. By training AI models to analyze MRI images and large sets of patient data, the project aims to predict who is at higher risk of developing dementia, before symptoms begin.

“

*With AI now, we can have an AI model that will be able to analyze MRI images or look up a bunch of different data to try to predict who will be at most risk.*



If successful, this approach could open the door to earlier interventions, improving the lives of those affected.

“

*We'll be able to save a lot of lives and help a lot of people live much better lives.*

## Overcoming Challenges

Like any research project, Omar's work comes with its fair share of challenges. Some of them are technical, particularly around medical imaging.

“

*Some of it is technical, relating to image processing, like the size of the image or the resolution of the image or the size of the voxel.*

Omar explains that deep learning models can be powerful, but they're often difficult to interpret, making it hard for doctors to trust.

“

*Some AI models like deep learning models are a little bit harder to explain how they arrived at their output, and doctors will be a little bit skeptical in trusting their output for that reason.*

The challenge, then, is bridging that gap by making the AI's decision-making process understandable to medical professionals.

“

*If you can explain that to doctors and they can understand the principle behind how they operate, they will have a little more trust in technology and be able to use [it] more often in their clinical practice.*

## Working at HIVE

Omar describes his time at HIVE as a meaningful and eye-opening experience. It's his first time working with a computer science team, and he's found real value in the interdisciplinary approach.

“

*I really enjoyed the fact that our team is multi-disciplinary... different backgrounds and different levels of experience all contributing.”*

He believes that collaboration across fields—engineering, medicine, ethics, and age groups—is essential not only to building practical tools, but to ensuring AI is developed responsibly.

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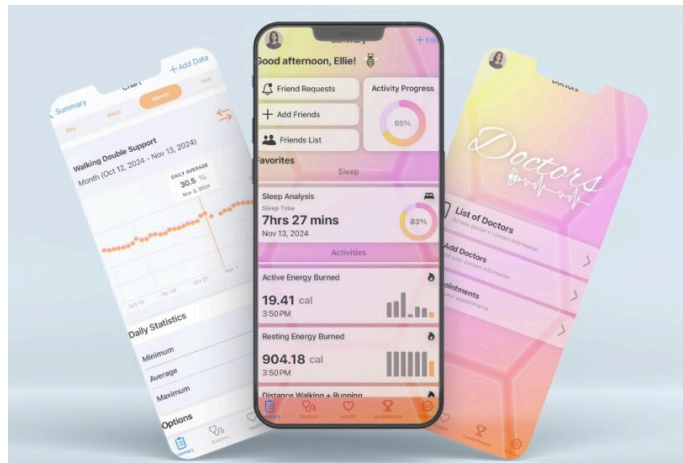
*We just need to make sure that we are including everybody in the conversation... so that hopefully the biases we have will not be propagated to the AI.*



# Current HIVE Projects

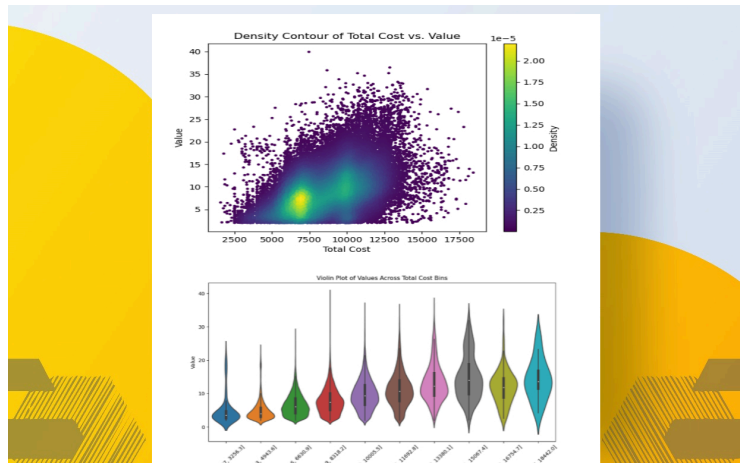


## BeeHealthy Personal Health App



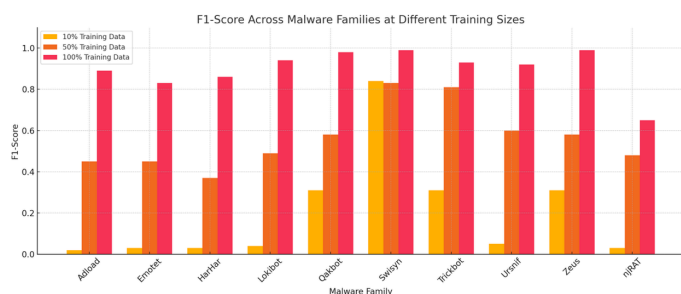
**BeeHealthy** is an all-in-one wellness app for iOS, developed by Hive AI Innovation Studio. Seamlessly integrated with **Apple HealthKit**, it enables users to track heart rate, sleep, activity, nutrition, and more through both automatic and manual inputs. Key features include a leaderboard with social goals, personalized themes and reminders, and the ability to export data for medical or personal use. The app is built using **Swift**, **PHP**, and **MySQL**. BeeHealthy was developed by Roxana Perez Gonzalez and Bao Bui, both undergraduate students at the University of Louisville.

## Solvita Recovery Optimization Model



The **Solvita Recovery Optimization Model** is an advanced interactive tool developed at Hive AI Innovation Studio to enhance decision-making in tissue recovery operations. Leveraging **machine learning techniques** implemented in **Python** with **Scikit-learn**, the model predicts tissue recovery outcomes, identifies cost drivers, and supports data-informed strategies for improving efficiency. It features capabilities for cost modeling, resource allocation, regional performance analysis, and benchmarking across different metrics. The model was developed by Isaac Emery, a graduate student from the University of Louisville.

## Dynamic Malware Detection Transformer-Based API Call Sequence Model



Hive AI Innovation Studio has **advanced malware detection** research through a **BERT-based** model that analyzes long system log sequences to identify malicious behavior. This AI-driven approach improves detection accuracy and supports the development of smarter threat detection systems. The project was led by Nouredin Youssef, a Ph.D. student from the University of Louisville, and Nour Elbarawi, an undergraduate summer intern from Egypt.



# HIVE's Vision and Mission



## Digital Transformation Center

Dr. Sharon A. Kerrick | Assistant Vice President



The University of Louisville Digital Transformation Center advances learning, research, and technology across Kentucky by promoting digital agility through collaboration and innovation. Led by Dr. Kerrick, Assistant Vice President and faculty member in the College of Human Development, the center supports diverse fields such as AI, data science, cybersecurity, robotics, quantum computing, neuroscience, public health, and advanced manufacturing through strategic partnerships and cutting-edge digital practices. As a major partner of Cyber HIVE, Dr. Kerrick has played a vital role in supporting its growth and mission. By fostering connections between academia, industry, and community, the center plays a key role in shaping Kentucky's digital future.

### Our Services



#### AI & Machine Learning

Tailored AI solutions, predictive analytics, chatbots, and automation to optimize operations across industries.



#### Cybersecurity

Full-spectrum protection with testing, assessments, and code reviews—powered by our UofL partnership.



#### App Development

Scalable, user-centric mobile and web apps built with agile methods for seamless cross-device experiences.



#### Data Analytics

Actionable insights through advanced analytics, real-time data processing, and interactive dashboards to fuel smarter decisions and growth.



HIVE was born from a visionary partnership between the **University of Louisville** and **Kindred Healthcare** in 2017, established to drive innovation in healthcare technology—particularly for aging care.

This collaboration brought together academic insight and industry expertise, laying the foundation for what would become a broader innovation ecosystem. In 2023, HIVE evolved into the **HIVE AI Innovation Studio**,

fully managed by UofL, with an expanded mission: to harness the power of machine learning, AI, cybersecurity, mobile app development, cloud solutions, and virtual reality to create transformative, community-focused technologies.

**Our mission** is to empower innovation through collaboration, research, and cutting-edge technology—preparing future leaders while delivering scalable solutions that matter.

Though Kindred Healthcare's direct role has concluded, its foundational influence remains deeply connected to HIVE's ongoing pursuit of human-centered innovation.

### CONTACT US



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### OUR SOCIALS



**Instagram**  
[hive.\\_bees](https://www.instagram.com/hive._bees)



**LinkedIn**  
[www.linkedin.com/company/hive-ai-innovation-studio](https://www.linkedin.com/company/hive-ai-innovation-studio)

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By Donating Here





# HIVE's Team



## Leaders



**Adel Elmaghraby**  
Director of Research & Innovation



**Adrian Lauf**  
Associate Professor



**Ibrahim Imam**  
Associate Professor



**Dr. Andrew Wright**  
Chair of Information Systems & Analytics



**Dr. Sharon A. Kerrick**  
Assistant Vice President



**Firuza Sharipova**  
Project Manager

## Affiliates



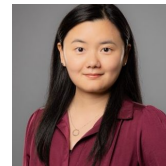
**Begoña Garcia Zapirain**  
Associate Professor



**Michael M. Losavio**  
Associate Professor



**Daniel Sierra Sosa**  
Assistant Professor



**Joy Li**  
Assistant Professor

## Developers and Researchers



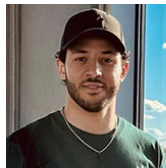
**Roxana Perez**  
App Developer



**Honey Patel**  
App Developer



**Isaac Emery**  
Research Engineer



**Youssef Sheta**  
VR Engineer



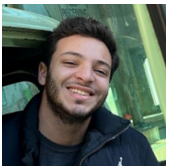
**Bao Bui**  
App Developer



**Noureldin Youssef**  
Cybersecurity Engineer & Researcher



**Sahar Sinene Mehdoui**  
AI Researcher



**Omar Sheta**  
VR Engineer



**Omar Emam**  
AI/Health Researcher



**Mona Ebadi Jalal**  
AI Engineer & Researcher



**Alejandro G-Quintero**  
Quantum Computing Engineer

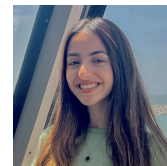


**Hamed Ebadi**  
Research Assistant

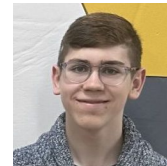
## Interns and Visitors



**Eduardo Benavides**  
Intern



**Nour Elbarawi**  
Machine Learning Engineer Intern



**Daniel Pinkston**  
High School Intern



**Rayna Mandadi**  
High School Intern



**Haitham Hazaymeh**  
Website Developer



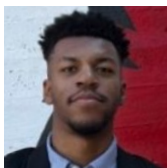
**Victor Flores Fonseca**  
Associate Professor



**Faidullah Moftah**  
Machine Learning Engineer Intern



**Haniyah Hakim**  
UI/UX Designer Intern



**Christopher Jones**  
CSE Cybersecurity Intern



**Sai Javvadi**  
High School Intern



**Vishnupriya Ramasamy**  
CIS Intern



**Alexandra Kachalova**  
High School Intern



**Graeme Langford**  
High School Intern



**Cyrille Kesiku**  
Machine Learning Engineer