



The Untapped Pipeline of the Cybersecurity Industry

Reflections on Cyber Clubs

Steven Ngo / stengo
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A cartoon mouse wearing a blue hoodie and holding a megaphone, standing in front of a wall of binary code.



whoami

3rd-year Software Engineering Ph.D. student @ UC Irvine

Broadly interested in research in software security, developer-centered security, and SWE + security education

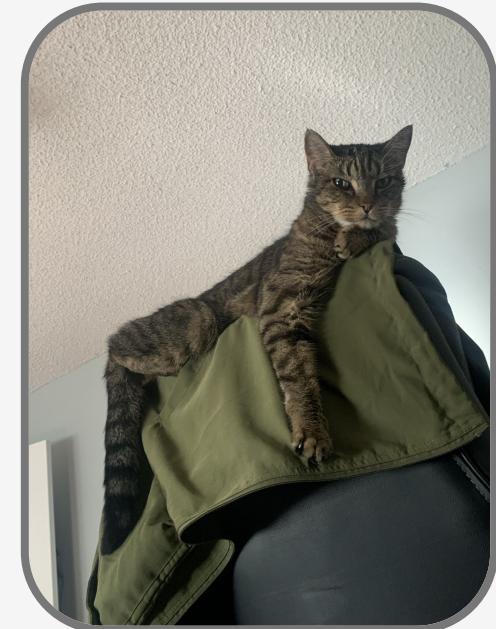
President of Cyber @ UCI

President since Spring '24 (took over in the spring of my 1st year)

Previously ran the cybersecurity club at Cal Poly SLO

Director of Academic Outreach with the National Upcycled Computing Collective (NUCC)

"Officially" appointed in August '25



Honey

Raising Awareness For...

College-level cybersecurity clubs, typically fully ran by students

- Benefits that these groups bring to their campus and institution **and** the security community + industry
- Challenges that these groups face while going after objectives that ultimately benefit the security community + industry
- Current points of 'discussion' and how you can support these groups

Positionality Statement



- Have experienced being a leader in *two* different security clubs
 - 1 at a teaching-focused institution, 1 at a research-focused institution
 - Only within California; not fully aware of how things are outside of CA
- Research time is currently invested into security education – I focus a lot more on how security education is currently happening than most
 - Thinking about it more in terms of research questions + publications, not necessarily to create a 'product' or provide a 'paid service'
- Limited experience with 'real-world' security; any experiences are at large tech companies

Would love to learn more about your perspectives!

What Are Cybersecurity Clubs?

Student-ran organization on a college campus that typically focuses on:

- General **exploration** of security careers and fields
- Security **awareness** for the greater community + letting students know about a **potential career path**
- Security **education** for others (e.g., workshops)
- Facilitating **participation in competitions** → CTFs, CCDC, CPTC, etc...
- Local **community** for students who are interested in security
- Usually does have a university faculty/staff serving as an 'advisor'

More Concrete Activities

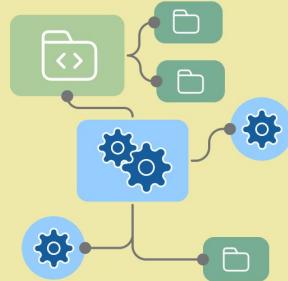
- Weekly workshops
- Guest speaker presentations
- Resume reviews and mock interviews
- Social activities
- Open “office hours”
- Competitions (CTFs, CCDC)
- Research projects

Workshop Week 6

A Newbie's Guide to System Administration



Date: Thursday (5/8)
Time: 6:30-8:00pm
📍 DBH 3011



~/cyber@uci/learn-linux

Overarching Goals

Members (and really, students) want **cool jobs that pay well + stable**

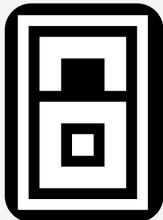
- By extension, they want skills and experiences that make them *marketable / hirable / AI-proof*

Members want to **grow the club** – convince more students to join, develop more ways for others to get involved, increase awareness and visibility for the club around campus

- Or at the very least, have a foundation to “maintain” things for the long run



< RITSEC >



b0llers

UMASS
CYBERSEC
CLUB

State of Security in School

For most CS degrees, little to no **applied** security education in the curriculum

- Not enough bandwidth to slot more content into a degree, especially amongst other competing priorities
- Have to teach a lot of the fundamentals of CS/SWE before tackling anything like security engineering, application security, cloud security

Few schools have professors who are teaching non-introductory security courses

- If any, it's more along the lines of computer & network security, software security, reverse engineering/binary exploitation
- May be locked behind prerequisites; can't take them until junior or senior year
- At R1 universities, tenure-track professors are primarily focused on their research

State of Security in School

There are security classes that are introductory, but often paint an incorrect picture of security in the real world

- *"theoretical focus on cryptography", "oversimplified and tedious assignments"*

Some classes end up getting mistaken as 'this is what security looks like'

- Some of these even end up scaring people away and make them think *"I never want to interact with security..."*

Benefits

No Courses? No Problem!

Viable path for security education for those who are interested in the space (but there aren't any readily available courses)

You learn bit by bit through attending general workshops, but it really picks up when you....

- Join some kind of competition / project / research team
- Ask more senior members for advice on where to start (and mentoring)
- “Osmosis” from being around the community
 - Spontaneous discussion on someone’s latest project or recent news
 - “I have this interview coming up... any thoughts on how I should prepare?”

Resume Building & Interview Story Farming

You gotta fill out your resume somehow... (again, how are you supposed to get "experience"?)

- Projects from courses that were assigned <<< projects you purposefully got involved in within your local cyber club
- Board member positions (+leadership), involvement in a small team (+teamwork)
 - *Doesn't have to be strictly security-related!*
 - Outreach, design, social media, event organization
- Don't underestimate the value of your accomplishment with stuff **unique to cyber clubs**
 - Hosting a regional conference led entirely by students...
 - Participating in a nationally-recognized cyber defense competition

Makes for excellent stories to tell in interviews and answers for behavioral interview questions!

Space and Community



How else do people with an interest in security or people looking to learn more connect with one another?

- Official recognition as a club on-campus and structure allows people to find others with like-minded interests
- Host competition teams, certification study groups, mentorship programs

Unique to us: access to some of the more thriving cybersecurity professionals and hacker communities in the country in SoCal (IVU, OC2600)

- If it's intimidating to go all on your own, then go with your clubmates!
- Volunteering opportunities to attend **security conferences for free!**

“Unstructured Tinker Time”

Your school assignments are often very specific, with provided test cases (“guardrails” for a course environment)...

- Not really supportive of the real world, where you get given more vague details for you to parse through (and trial & error through...)

Cyber clubs allow for more open-ended skills development, ‘tinkering’ around in an ‘unstructured’ fashion

- “Here’s this router, try to do this with it...”

Some Generalized Anecdotes

- First years w/ very minimal experiences in CS & cybersecurity → Contributing team members in competitions, board, and project teams
 - There's definitely a learning curve, but far from impossible (takes some grit and failure)
- Cybersecurity is not always for everyone, but a cyber club often becomes a prominent “gateway” into the field for their campus
 - Classes are one thing, but how about the community?
- Physical computing infrastructure being a very unique allure that other CS clubs and subdisciplines don't offer
 - “Plop a server right in front of someone, and open it up...”
- Consistent involvement → ‘free’ registration for DEFCON, LayerOne, BSides
 - IVU and OC2600 organizers are long-time DEFCON attendees with volunteering opportunities

Challenges

The “Revolving Door”



The “Revolving Door”

Constant rotation of leadership **w/o any stability**

- Board members / leads typically only serve for ~1-2 years, and then graduate
- Best practices and lessons learned aren't always necessarily passed down...

Members come in and out, typically no commitment required

- Incentive to stick around has to come from within - no “mandatory attendance” or “grades” or “payment”
- People explore different clubs, get really busy with classes, want to hang out more with friends, etc

Varying Faculty/Staff Support

These are the **stability** that clubs need – but finding a committed one can be difficult...

- At a research-focused institution, faculty's main incentive == research; not as involved with the day-to-day to really oversee growth

Ultimately, still has to be led by **students**, but proper guidance and having the right connections can go a long way

“Blind Leading the Blind”

Students with ***minimal real-world experience*** in security themselves **helping educate others** in the discipline

- They do what they can... Goes to show how much effort students put in to be a lead
- Wide range of people who step up - some did CTFs in high school, some haven't touched security until they joined the club + really liked it

More senior members may be relying on internship experience, “tribal knowledge” being passed down (e.g., reusing workshop materials)

Guest speakers help a lot in this aspect, but not always easy to find

“Security is Scary”

Multiple factors that contribute to security being viewed as scary by others:

- Classes and curriculum not really baking in the fundamentals
- Often requires fundamental knowledge elsewhere
- Other classes get labeled as ‘this is security’ despite not providing a proper view of what’s available within the field
- At the end of the day, is a difficult field
 - And even in tech, often is a team that “blocks” progress...

Absolutely no one:
Hackers in movies:



Popular media and culture also doesn't paint the field in a light that makes it as appealing as some of the other hotter topics in CS

Developing Engaging & Interesting Content

A lot of cool, impactful, interesting stuff in security →

Finding vulns/CVEs, reversing malware, tooling and defenses, tracking threats,
forensics, pentesting/red teaming

And so on...

But how do we teach it?

Open Questions

- How do clubs align what they do to best prepare students for careers in security while also developing engaging content?
- What kinds of projects or club offerings get people to stick around the most?
 - Also ties into club culture, just being friendly and welcoming
- Should clubs be cold-emailing companies for sponsorships, guest speaker engagements, collaborations, etc., or is there a more refined way to connect?
- How do clubs make security not as scary as it is (on par with other CS disciplines at least) and attract more members?
 - Also acknowledging that it's not for everyone, can't retain everyone

Solutions . . . ?

Succession Planning

Though, planning for the future of the club isn't always at the top of an undergraduate student's minds...

- Finishing up their degree, internships, interviewing for full-time positions, social life
- The club itself doesn't pay them anything...

What's the most **lightweight** method of succession planning / leadership continuity that can be adapted **in a variety of situations?**

Alumni “Councils” / “Advisory Boards”

Anecdotally, some cyber clubs (e.g., RITSEC) have been able to have long-standing success due to their alumni support

- Need for an “official” mechanism to engage with alumni, whether they just graduated or have been out for 10+ years
- They have insight into current trends in industry and lessons learned from when they were a part of club (ideally, also leadership)

If you can make it look official/professional, it also looks good when trying to also get sponsors and mentors

The National Upycled Computing Collective

NUCC: SoCal-based non-profit that “upcycles” computing equipment and hardware for research, education, and outreach purposes focused around security and hacking

Starting in 2022, got roped into security education by supporting UCI with their own server infrastructure



SoCal Cyber Clubs & Untitled Infra Server

These are student-/alumni-led Discord servers where many of the club leadership across cyber clubs in California are in and chat a lot with each other

Serves as a “network” of cyber clubs....

- UC campuses: Irvine, Davis, Santa Cruz, Riverside, Los Angeles
- CSU campuses: Fullerton, San Bernardino, Los Angeles, Long Beach, Northridge
- Community colleges too!

Great place to share events, ask for ideas and advice, and also expand your own network!

Rallying Support

“Spare change , ma ’ am?”



They Really Do Care!

Students may be hesitant to reach out or send a cold email, or simply not know who to reach out to

Being a board member isn't their day-to-day.... But ultimately they **care about security and can become a vital part of the community**

Your Mileage May Vary

Different clubs have different needs...

- Some need A LOT more funding and resources to operate properly
- Some want help with developing pipelines for internships/full-time jobs to attract members
- Some want to figure out what they should be teaching to best prepare students for real-world security jobs
- Some want some project and research ideas
- Some just need guest speakers to flesh out their workshop schedule

Supporting Your Local Club

Some ways you can help:

Reach out to them first! Offer whatever you can **based on your availability**

- Guest speaker engagement
- Continued mentoring
- Connection with your employer → sponsorships, internship pipelines, visibility
- Advice to do XYZ
- Coaching for a competition team
- Offering your support for when they advocate for more resources on campus

Thanks!

Reach out:

School Email - sknqo1@uci.edu

NUCC Email - stengo@nuccinc.org

Discord - stengo

