



# Northwest Virtual Institute for Cybersecurity Education & Research (CySER) A VICEROY Project

A Five-institution Virtual Institute Consortium

*Building an Enhanced Center for Academic Excellence in Cybersecurity Knowledge, Skills  
& Abilities for a Military & Defense-aligned Civilian Workforce*

**Washington State University PI: Prof. Bernie Van Wie**

**[bvanwie@wsu.edu](mailto:bvanwie@wsu.edu); 509-335-4103**

**WSU Co-PIs: Assefaw Gebremedhin, Noel Schulz**

**External Evaluator: Olusola Adesope**



# CySER: People

- **Washington State University (WSU)**

- Bernard Van Wie (VSCBE; Lead PI)
- Assefaw Gebremedhin (EECS; Co-PI; Research Lead)
- Noel Schulz (EECS; Co-PI; Seminars/Industry Lead)
- Venera Arnaoudova (EECS; CS Curriculum)
- Olusola Adesope (Education; Evaluator)
- Partha Pande (EECS; SP)
- Haipeng Cai (EECS; SP)
- Robert Crossler (MISE; SP)
- Jana Doppa (EECS; SP)
- Arda Gozen (MME; SP)
- Larry Holder (EECS; SP)
- Chris Hundhausen (EECS; SP)
- Ananth Jillepalli (EECS; SP)
- John Miller (EECS; SP)
- Gabriel Nketah (Project Coordinator)
- **James Crabb (Project Admin)**

- **WSU/UI ROTC**

- Lt. Col. Nicholas Jeffers
- Major Paul Hyde

- **Montana State University (MSU)**

- Clemente Izurieta (MSU Site Lead)
- Lt. Col. Lance Ratterman



- **University of Idaho (UI) – CAE-CD**

- Terence Soule (UI Site Lead)
- James Alves-Foss



- **Columbia Basin College – CAE-CD**

- Mathew Boehnke (CBC Site Lead)
- **T. Lee Williams**



- **Central Washington University**

- **Andrew Van Den Hoek, ROTC**
- **ITAM David Douglas (Pending)**





<https://www.instagram.com/p/Ckd0wMCL8wu/>

- CySER Website: [cyser.wsu.edu](https://cyser.wsu.edu)



WASHINGTON STATE  
UNIVERSITY

NORTHWEST VIRTUAL INSTITUTE FOR CYBERSECURITY EDUCATION AND RESEARCH | CYSER



## OVERVIEW



Overview

People

Certificate Offerings

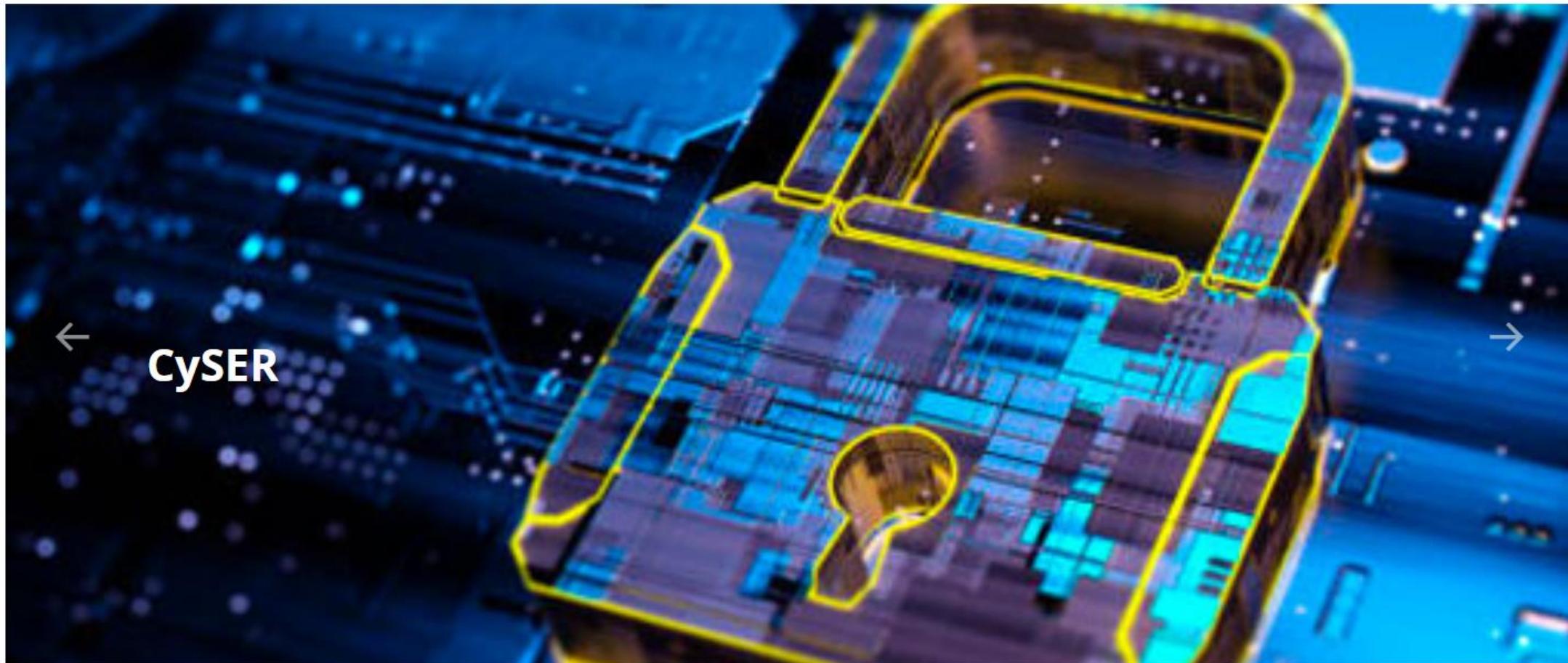
Seminars

Summer Workshop 2022

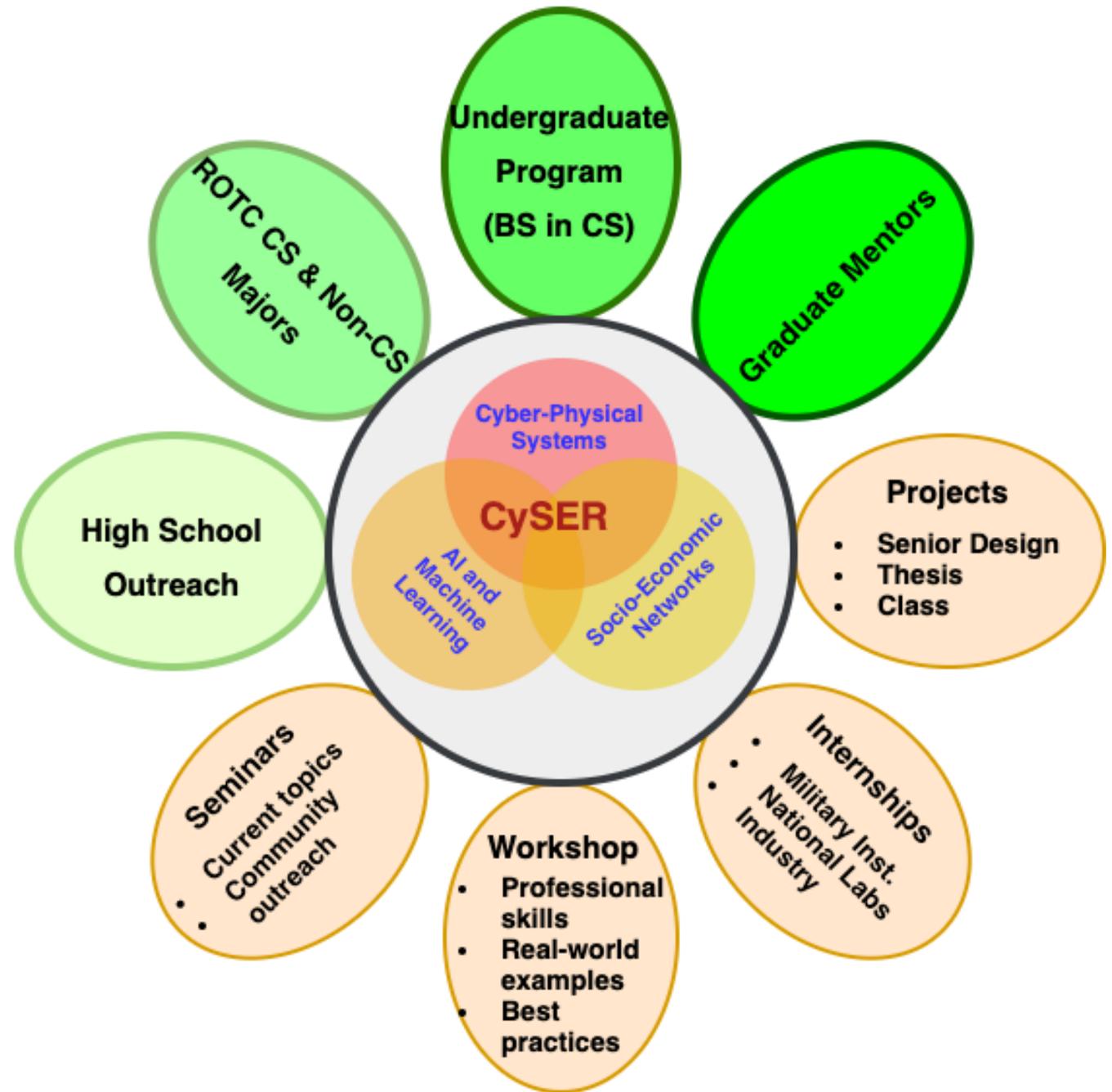
Internship Information,  
News and Events

Apply to the CySER  
Program

Contact Us



# CySER Vision



# CySER Vision

- Responsive respond to **VICEROY call**
  - Training ROTC cadets & DoD-aligned undergraduate civilians in cybersecurity: coursework, mentored research, clubs/competitions, seminars, summer workshop, internships
- Built a strong consortium in the Pacific Northwest for cybersecurity education and research
  - WSU, MSU, UI, CBC, CWU complementary strengths and diverse populations
- Positioning WSU & MSU to attain Centers of Academic Excellence in Cyber Operations (CAE-CO) and Cyber Defense (CAE-CD) respectively
  - Designation conferred by National Security Agency
  - Requirements: 10 Mandatory and 10 (out of 17) Optional Knowledge Units

# CySER Program Elements

- **Coursework** – three *new courses* being offered
- **Senior design projects** focused on cybersecurity
- **Internships**
  - GI; Future @ DoD sites
  - PNNL, SEL, INL, Hoplite
- **Two-week summer workshop**
- **Seminars**
- **Research** (graduate student-mentored activities)
- **Competitions** – “Cybersecurity Science Bowl”
- **High school outreach**
  - Pullman High School

# Schedule

## FALL 2021 SEMINAR SERIES

Date	Speaker	Title/Media
Nov. 29	 <u><a href="#">Dr. Clemente Izurieta</a></u> Gianforte School of Computing Montana State University	<u><a href="#">Hierarchical Software Quality Assurance Approach to Leveraging Existing Technologies and Building Quality Gates</a></u>  <u><a href="#">Recording</a></u> <u><a href="#">Slides</a></u>
Nov. 8	 <u><a href="#">Matthew Boehnke</a></u> Department of Computer Science Columbia Basin College	<u><a href="#">Cyberhawks and Beyond</a></u>  <u><a href="#">Recording</a></u> <u><a href="#">Slides</a></u>
Oct. 25	 <u><a href="#">Dr. Jim Alves-Foss</a></u> Department of Computer Science University of Idaho	<u><a href="#">Probabilities, Percentages, and Professions of Performance</a></u>  <u><a href="#">Recording</a></u> <u><a href="#">Slides</a></u>
Oct. 11	 <u><a href="#">Dr. Assefaw H. Gebremedhin</a></u> School of EECS Washington State University	<u><a href="#">CySER Overview and Machine Learning</a></u>  <u><a href="#">Recording</a></u> <u><a href="#">Slides</a></u>

# Schedule

## SPRING 2022 SEMINAR SERIES

Date	Speaker	Title/Media
May. 2	Cory Baker Cybercore Integration Center Idaho National Laboratory	<a href="#">Cybersecurity for the Operational Technology Environment</a>
Apr. 18	Kevin Brennan FBI – Special Agent	<a href="#">The Cyber Threat Landscape – The FBI's Perspective</a>
Apr. 4	 <a href="#">Karl Scheuerman</a> CrowdStrike – Falcon Complete	<a href="#">Cyber Security Operations on the Front Line</a> <a href="#">Recording</a> <a href="#">Slides</a>
Mar. 21	 <a href="#">Elena Peterson</a> Pacific Northwest National Laboratory	<a href="#">Flexible and Adaptive Malware Identification Using Techniques from Biology</a> <a href="#">Recording</a> <a href="#">Slides</a>
Mar. 7	 <a href="#">Charles Carroll</a> Schweitzer Engineering Laboratories	<a href="#">Purposeful Design – Defending Critical Infrastructure</a> <a href="#">Recording</a>
Feb. 7	 <a href="#">Bryson Bort</a> Scythe and ICS Village	<a href="#">Can you hack it? Starting your own company</a> <a href="#">Recording</a> <a href="#">Slides</a>
Jan. 10	 <a href="#">Deborah Wells</a> Information Technology and Administration Central Washington University	<a href="#">Deepfakes and Cybersecurity Concerns</a> <a href="#">Recording</a> <a href="#">Slides</a>

# Seminars



## NORTHWEST INSTITUTE FOR CYBERSECURITY EDUCATION AND RESEARCH

### CySER Virtual Seminar

#### VICEROY PIs

Bernard Van Wie (WSU)  
Clement Izurieta (MSU)  
James Alves-Foss (UI)  
Matthew Boehnke (CBC)  
LTC Andrew Van Den Hoek (CWU)

Oct 17, 2022, 3:10 – 4PM PDT

Team Link: [Click here to join the meeting](#)

Meeting ID: 287 304 495 40 | Passcode: wdM7Vw

Call in (audio only) +1 509-498-6399 | Phone Conference ID: 834 528 822#

#### About CySER:

CySER is a consortium of five institutions in the Northwest led by Washington State University (WSU). Its goal is creating an innovative education and research program in cybersecurity for ROTC and DoD-aligned civilians at the undergraduate and graduate level, with a primary emphasis on undergraduate education. The other four partner institutions are Montana State University (MSU), University of Idaho (UI), Columbia Basin College (CBC), and Central Washington University (CWU).

The CySER program is funded explicitly through the DOD Air Force Military Command's Virtual Institutes for Cyber and Electromagnetic Spectrum Research and Employ (VICEROY) initiative. The Griffiss Institute manages the VICEROY project.

#### About this seminar:

Our first seminar for the Fall 2022 semester will involve updates from PIs at each of the partner institutions regarding:

- Number of undergraduate and graduate students involved
- Research activities
- Internship activities
- Coursework activities
- Student clubs and cyber competitions

This will be a great opportunity for new and returning CySER students to hear about what is happening at their home institutions and ways to get involved in cyber-related extracurricular activities.

[cyser.wsu.edu](https://cyser.wsu.edu)



## NORTHWEST INSTITUTE FOR CYBERSECURITY EDUCATION AND RESEARCH

### CySER Virtual Seminar

#### Slater Weinstock Casaba Security

WebAuthn: How Passwordless Authentication Works

Nov 14, 2022, 3:10 – 4PM PDT

Team Link: [Click here to join the meeting](#)

Meeting ID: 287 304 495 40 | Passcode: wdM7Vw

Call in (audio only) +1 509-498-6399 | Phone Conference ID: 834 528 822#

#### Abstract:

This seminar will cover the Web Authentication API (also known as WebAuthn), and we will explore how passwordless authentication works. This will include a conversation over Passkeys.

Further, we will cover the security implications of using a password and how WebAuthn addresses these security concerns.

#### Bio:

Slater Weinstock is a Security Engineer with Casaba Security. He has a background in working on multiple high-profile projects with clients including Microsoft and Meta. Slater focuses on new identity providers, authentication mechanisms, state machines, and mobile application security. He holds a Bachelor of Science degree in Computer Science from Washington State University.

[cyser.wsu.edu](https://cyser.wsu.edu)



# Seminars – Fall 2023

## FALL 2022 SEMINAR SERIES

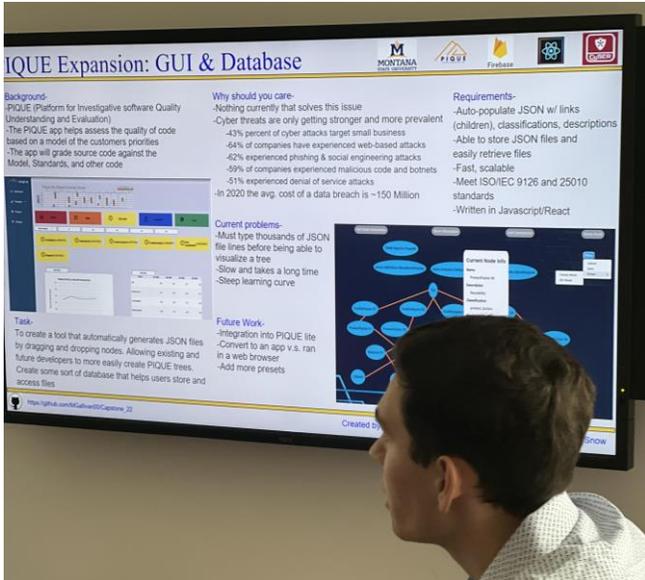
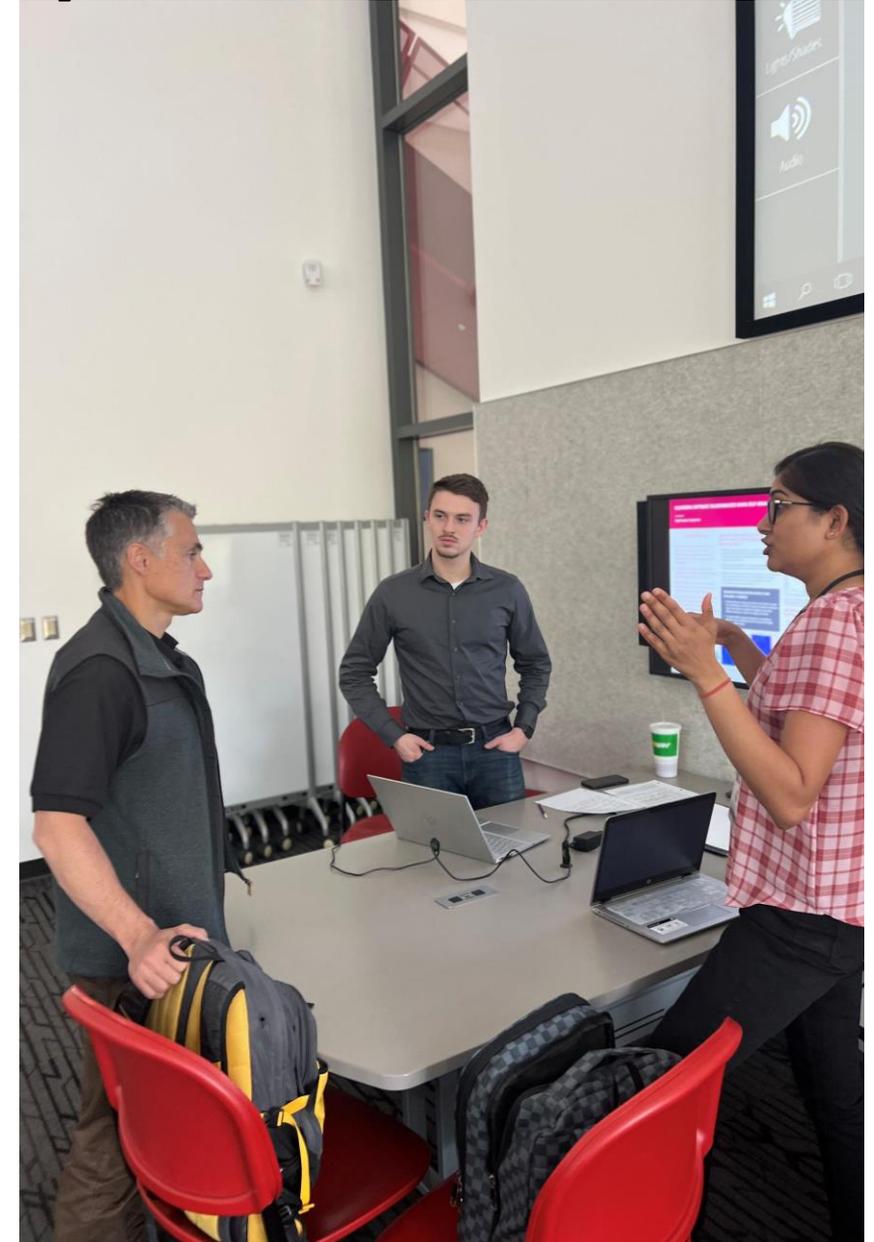
Date	Speaker	Title/Media
Oct. 17	CySER PIs at partner institutions	<a href="#">Fall Seminar Series Kick-off: updates from partner institutions</a> <a href="#">Recording</a> <a href="#">Slides</a>
Oct. 31	TBD	TBD
Nov. 14	Slater Weinstock Casaba Security	TBD
Nov. 28	James Halvorsen School of EECS WSU	TBD
Dec. 12	Haipeng Cai School of EECS WSU	TBD

# Key Tasks [Detail on Experiential Learning]

- Experiential Learning
  - Mentored cybersecurity research
  - Summer workshop: extensive hands-on components
    - Poster session
  - Leadership – Team Building
    - Major Paul Hyde (WSU)
    - Retired Captain Andrew Van Den Hoek (CWU)
    - LTC Lance Ratterman (MSU)
  - Internships
  - Mentored senior design projects
  - Cybersecurity seminars
  - 3 field trips:
    - Schweitzer Engineering Lab (Pullman, WA)
    - Fairchild Air Force Base (Airway Heights, WA, near Spokane)
    - Keyport Undersea Warfare Center (Keyport, WA)
  - participation on a competitive cybersecurity team (CBC)



# Key Tasks [Poster Presentations]





- Recruitment - Poster



# NORTHWEST VIRTUAL INSTITUTE FOR CYBERSECURITY EDUCATION AND RESEARCH



[cyser.wsu.edu](http://cyser.wsu.edu)

## WHY JOIN CySER?

- \$1000 stipend per semester
- \$2000 stipend for attending a 2-week summer workshop in May, here on the WSU campus
- Help finding cybersecurity-related summer internships
- Summer workshop involves presentations and discussions with cybersecurity professors and industry professionals, hands-on activities where participants learn how to use cybersecurity tools and techniques, and field trips to tech and defense sites (the complete agenda from this past summer workshop can be found on the website)
- Bi-weekly seminars from cybersecurity professors and professionals
- Book club with assigned cybersecurity non-fiction reading and bi-weekly discussions
- Participation in mentorship program with graduate student mentors working on cybersecurity-related research, including presentation of that research in a poster session at the summer workshop

## INTERESTED IN CYBERSECURITY?

- Put your computer science skills to the test.
- Develop a deeper understanding of the tech world and how modern infrastructure and data is protected.
- Cybersecurity professionals are in high demand, and have average starting salaries above those in many other fields.
- WSU offers two certificates that can be earned alongside your Bachelor's Degree: CySER CAE-CO Fundamentals, and CySER Basics.

## ABOUT CySER

- Funded by DoD through the Griffiss Institute
- Member of the VICEROY program
- For more info, visit [cyser.wsu.edu](http://cyser.wsu.edu)

## WHO CAN APPLY?

- Undergraduates in any year (freshman through senior)
- Citizenship or green card required by DoD
- Must be able to participate **Fall 2022** and **Spring 2023** (one academic year)
- Attendance required for seminars, and participation in mentorship program.

APPLY AT [cyser.wsu.edu/apply/](http://cyser.wsu.edu/apply/)



GRIFFISS  
INSTITUTE

# Student Recruitment

- Recruitment

- Website (WSU students)
- WSU Curriculum Advisor (12 years military experience)
- Communication with ROTC (WSU, MSU, UI, CWU)
- Faculty in Classrooms (CBC, UI)
- Poster

- Retention

- Stipend helps
- Involvement/Meetings/Research
- Little attrition (~1/school)

## APPLY TO THE CYSER PROGRAM

Are you a US Citizen? - [You must be a US citizen to receive a stipend] (Required)

- Yes
- No

FIRST NAME (REQUIRED)

Please enter your first name

LAST NAME (REQUIRED)

Please enter your last name

EMAIL (REQUIRED)

Please enter your email address

PHONE NUMBER (REQUIRED)

Please enter your phone number

MAJOR (REQUIRED)

Please enter your major

YEAR IN PROGRAM (REQUIRED)

Select your current class standing

GPA - IF 1ST SEMESTER FRESHMEN SUPPLY HIGH SCHOOL GPA (REQUIRED)

Please enter a number from 0 to 4.

First semester Freshman?

Yes

UNOFFICIAL TRANSCRIPT (REQUIRED)

No file chosen

Accepted file types: jpg, png, pdf, Max. file size: 5 MB.

Are you in ROTC (Required)

- Yes
- No

SUPPORTING DOCUMENTS - RESUME/CV (REQUIRED)

Drop files here or

Accepted file types: jpg, png, pdf, Max. file size: 5 MB.

Feel free to upload cover letters as well!

Are you willing to commit to the CySER Fundamentals or Basics Certificate Program? (Required)

- Yes
- No

For a more detailed description of the above, please go to [this link](#). All applications for the Spring Semester of 2022 are due **Friday, January 7, 2022**



School of  
Electrical Engineering and Computer Science  
VOILAND COLLEGE OF ENGINEERING AND ARCHITECTURE

Dear Torres:

Congratulations, we would like to offer you the opportunity to join the Cyber Security Education and Research Certificate (CySER) Program as a trainee participant supported by the Griffiss Institute.

Computer Science Majors: we ask you to commit to the CySER CAE-CO Fundamentals Certificate Program (next page) to the extent remaining time in your degree program permits.

Non-Computer Science Majors: we ask you to commit to the CySER Basics Certificate Program outlined on the next page, to the extent remaining time in your degree program permits.

ROTC cadets and civilian participants committing to either program will receive a \$1,000 stipend for Fall 2022 and \$1,000 for Spring 2023 as long as you meet the criteria for staying in the CySER program, followed by a \$2,000 stipend for attending the May 22 – June 2, 2023 summer workshop. You need to be involved in cybersecurity or a special problems project research with a CySER faculty/graduate mentor pair starting as soon as you are accepted into the program and/or a senior cybersecurity design project. More information about CySER is contained on our website: <http://cyser.wsu.edu>.

Please sign below that you are willing to commit to one of the CySER programs as outlined above and return to Project Coordinators Dr. James Crabb ([jamescrabb@wsu.edu](mailto:jamescrabb@wsu.edu)) and Gabriel Nketah ([gabriel.nketah@wsu.edu](mailto:gabriel.nketah@wsu.edu)) and Prof. Noel Schulz ([noel.schulz@wsu.edu](mailto:noel.schulz@wsu.edu)).

Student Name (printed): \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Please let me know if you have any further questions.  
Sincerely,

Prof. Noel Schulz  
Edmund O. Schweitzer III Chair in Power Apparatus and Systems  
Co-PI, VICEROY CySER Team, Washington State University Pullman  
email: [noel.schulz@wsu.edu](mailto:noel.schulz@wsu.edu), (o) 509-335-0980

# Student Metrics

## Recruiting for Fall 2022

- **WSU:** 14-15 new, 13 continuing
- **MSU:** 4 new
- **CBC:** 4 continuing; seeking 6 more w/in budget
- **CWU:** 1 new; 3 continuing
- **UI:** 1 new; 1 continuing; seeking 2-4 more w/in budget

# The three new courses

- **CptS 327: Introduction to Cybersecurity**
  - Focus: Computer, Web, and Application Security
  - KUs targeted: M7, M8, M9, 04, 013, C4
- **CptS 427: Applied Cybersecurity**
  - Focus: Software, Network, and Cloud Security
  - KUs targeted: M4, M9, 02, 03, 04, 013, C4
- **CptS 428/528: Advanced Cybersecurity**
  - Focus: Reverse Engineering and Forensics
  - KUs targeted: M2, 08, 011, C1, C2, C5, S1, S2, S7

# NW VI CySER Program Summer Workshop – Week 1

## In WSU's Todd Hall 203

### 8:30 AM – 5:00 PM, unless stated otherwise

Day	Topic	Session Leader
	Welcome – WSU Deans Office	Registration
<b>Monday</b> May 23 AM	Welcome – Director EECS& WSU's commitment to Cybersecurity Industry Perspective, Schweitzer Engineering Lab DoD Perspective	Welcome & Orientation Nathan Kip
<b>Monday</b> May 23 PM	Digital forensics	Clem Izurieta & Andrew Fallin
<b>Tuesday</b> May 24 AM	Cyber Warfare & International Relations: Citizen Behavior, Perceived Threats Legal Issues & Ethics; Intro On Cybersecurity & Privacy, Case Studies, Threats, Laws Risk Models & Processes	Rob Crossler, Justin Stachofsky & Paul Wilmoth
<b>Tuesday</b> May 24, PM Spark G10	Graduate Student Posters Research & Networking Undergraduate Posters Research & Networking	CySER PhDs/faculty CySER Undergraduates Research Discussion Groups
<b>Wednesday</b> May 25 AM	Track I: Todd 203 – Instructional Design 8:30 AM All Undergrads/Grads/Faculty: Day-in-the-Life of a Cybersecurity Professional 9:30 AM CySER Faculty & Graduate Mentors 11:15 AM Sola: Group Work & Facilitating Group Discussions	Slater Weinstock Chris Hundhausen, James Crabb, Adesope, Van Wie,
<b>Wednesday</b> May 25 AM	Track II: Spark 212 – Team Building, Leadership 9:30 AM: Team Building, Leadership, Legal Issues/Ethics	Maj. Paul Hyde (WSU), Van Den Hoek (CWU), Lance Ratterman (MSU)
<b>Wednesday</b> May 25 PM	Case studies, Threats, Laws; Cybersecurity Competition Teams Virtualization, Forensics on VM, Dark Web Graph Mining for Insider Threat Detection	Deb Wells Lawrence Holder
<b>Thursday</b> May 26, AM	Field Trip Industry Perspectives, Relay Protection, etc.	Industry perspectives: Schweitzer Engineering Lab
<b>Thursday</b> May 26 PM	Best Practices, Practical Examples Cryptography, Cloud Security, Networking, Web/Mobile/Desktop App Penetration Testing	Hoplite, Anthony Cochenour CEO Slater Weinstock, Casaba Security Noah Black, CWU
<b>Friday</b> May 27	Cybersecurity in Military Practice: Fairchild Air Force Base – Airway Heights, WA	Karl Scheuerman/Field Trip to Fairchild AFB
<b>Saturday</b> May 28	National Cyber League – Matt Boehnke H4D (Hacking for Defense): Virtual Capture the Flag / Trainee Hack-A-Thon Hiking / Picnic / Transportation Available	Hands-on fun team-based cybersecurity training Social Event

# NW VI CySER Program Summer Workshop – Week 2

In WSU's Todd Hall 203

8:30 AM – 5:00 PM, unless stated otherwise

Day	Topic	Session Leader
May 29-30	Optional Picnic	Memorial Day Weekend
<b>Tuesday May 31, AM</b>	Micro-power, Grid security Applications of Machine Learning	Noel Schulz Assefaw Gebremedhin & James Halverson
<b>Tuesday May 31, PM</b>	Clustering Software Vulnerabilities Using Self-organizing Maps. Hands-on MATLAB Human-in-the-loop Anomaly	Khyati Panchal, John Miller, Tim Cain Jana Doppa
<b>Wednesday June 1, AM</b>	Interconnect Meets Architecture: On-Chip Communication in the Age of Heterogeneity Simulating cyber-attacks to biological systems; detection/mitigation in MATLAB Smart phone technology operating system (Android, iOS,)	Partha Pande Arda Gozen & Brenden Fraser Hevlin Haipeng Cai
<b>Wednesday June 1, PM</b>	Hands-on Linux tools for binary reverse engineering Army Cyber Command, Defending the Network, Cloud, Global Theaters, NSA Lifelong learning; Getting the most out of your internship	Jim Alves Foss Matt Boehnke Sola – Assessment Survey
<b>Thursday June 2</b>	Travel to Keyport Naval Undersea Warfare Center	Keyport
<b>Fri June 3</b>	Keyport Naval Undersea Warfare Center	Keyport; Sola – How was Keyport?

# Schedule

- Summer workshop: <https://cyser.wsu.edu/summer-workshop/>
- May 23 to June 3, 2022, at WSU in Pullman, WA: presentations, tutorials, and hands-on experiential learning activities
- Field trips: a half-day trip to Schweitzer Engineering Laboratories (SEL, Pullman), full-day Fairchild Air Force Base, 2-day to Keyport Naval Undersea Warfare Center.
- In person, virtual option
- Slides, related material, and recordings of all sessions (excluding the field trips) posted on CySER website
- Topics:
  - Cybersecurity in industrial control systems
  - Digital forensics
  - Cybersecurity and behavioral threats
  - Cyber education
  - Team building and leadership
  - Virtualization
  - Software assurance and trusted software bills
  - Cybersecurity competitions and the National Cyber League
  - Cybersecurity in power systems
  - Adversary emulation, purple teaming, and ICS
  - Applications of machine learning in cybersecurity
  - Human in-the-loop learning for anomaly detection
  - Clustering software vulnerabilities using self-organizing maps
  - On-chip communication in the age of heterogeneity
  - Cybersecurity in biomanufacturing
  - Smartphone technology security
  - Binary analysis
  - US Army Cyber Command
  - Being a Lifelong Learner
- Daily summary emails were sent to workshop participants



# Key Tasks/Plans

- A bi-weekly virtual seminar series was established - Fall 2022 & Spring 2023
- CySER Summer Workshop, 2023 - May 22 to June 3, 2023
- Many undergraduates from NW VI did internships last summer
  - GI (Sending Out Link Soon)
  - ACE, PNNL, SEL, RadixIoT, & Hoplite Inc.
- Outreach to High Schoolers



# CySER – Cyber Competitions

## Cyber Force Competition Team

- Zachary Werle
- James Minteer
- Kaitlin White
- Kwan Tou To
- Gwyn-Usry Gwyn
- Matthew Kusman
- Gerrit Bruland
- Zane Chalich
- Brian Kirika
- Alexander Hagood
- Guinevere Fish

# CySER – Cyber Competitions

## **NICCD Competition Team**

- **Zachery Werle – Team Lead**
- **James Minter**
- **Kaitlin White**
- **Gerrit Bruland**