

# CSC478 - Deliverable 1

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# 1 Introduction

Our team’s vision for **Campus Connect** is to build an academic communication platform that blends the immediacy and ease of Discord with the structure and expectations of a university environment. Email is often too formal and too slow for day-to-day classroom collaboration; meanwhile, Discord tends to be adopted only in a handful of technical departments. *Campus Connect bridges this gap* by giving professors and students a dedicated space to create classrooms (analogous to servers), organize discussions into channels, share course files, and ask natural-language questions about class logistics and materials.

Beyond real-time chat, Campus Connect will centralize course resources (syllabi, assignments, notes) and provide an integrated retrieval-augmented model (RAG) so students can ask questions like, “When is assignment 2 due?” and receive accurate, context-aware answers drawn from classroom content. The goal is a single, user-friendly hub that makes communication faster, resources easier to find, and academic collaboration more effective.

## 2 Architecture

At a high level, users access the web frontend, traffic enters through a Kubernetes *Ingress Controller*, and the backend (NestJS) coordinates authentication, classroom logic, and communication with core data services. File storage, vector search for the RAG workflow, and real-time features are provided by dedicated services within the cluster.

Figure 1 shows the overall system.

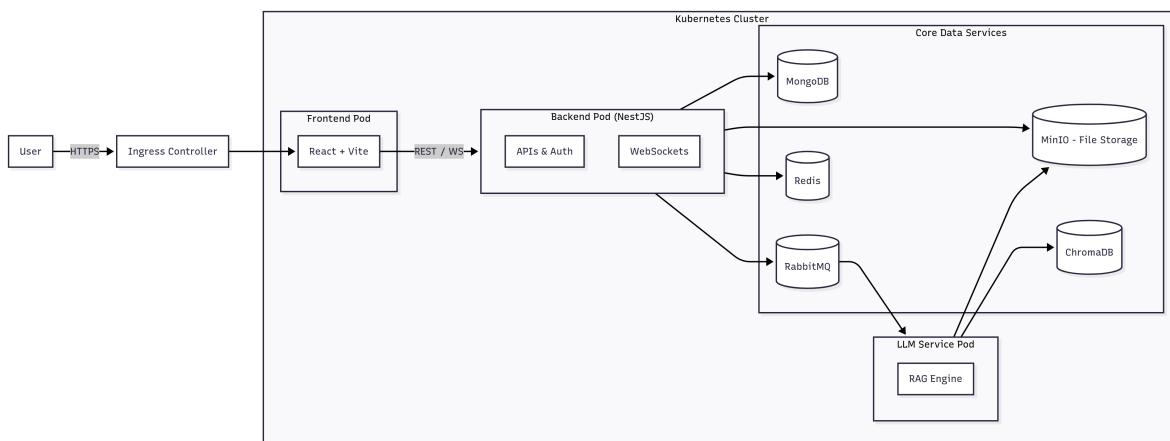


Figure 1: Campus Connect High-Level Architecture

### Key Components

- **Ingress Controller:** Entry point routing requests into the cluster.
- **Frontend (React + Vite):** UI for classrooms, channels, file uploads, and RAG queries.
- **Backend (NestJS):** APIs, WebSockets, authentication, classroom/channel logic.
- **LLM Service:** RAG engine that indexes classroom files and answers natural language questions.
- **Core Data Services:** MongoDB (persistence), RabbitMQ (events), Redis (cache/WS), MinIO (object storage), ChromaDB (embeddings).

All components run in a Kubernetes cluster bootstrapped with kubectl on one control-plane node and two workers.

### 3 Implementation Approach

#### Repository Structure

- **Infra/Cluster** — Terraform definitions, custom provider, Ansible bootstrap, Helm charts, Keel.
- **Backend** — NestJS service (APIs + WS) with MongoDB, Redis, RabbitMQ, MinIO.
- **Frontend** — React + Vite client for chat, file management, and RAG queries.
- **LLM Service** — Processes files into embeddings (ChromaDB) and answers queries.

#### CI/CD Overview

Each app repository builds container images and pushes them to GHCR on release tags. Keel, running in-cluster, automatically updates Deployments when new images are available. Infrastructure provisioning runs from GitHub Actions using Terraform (custom provider), followed by Ansible to bootstrap Kubernetes and Helm to deploy services.

Figure 2 summarizes the pipeline, and Figure 3 shows the workflow trigger interface used in class.

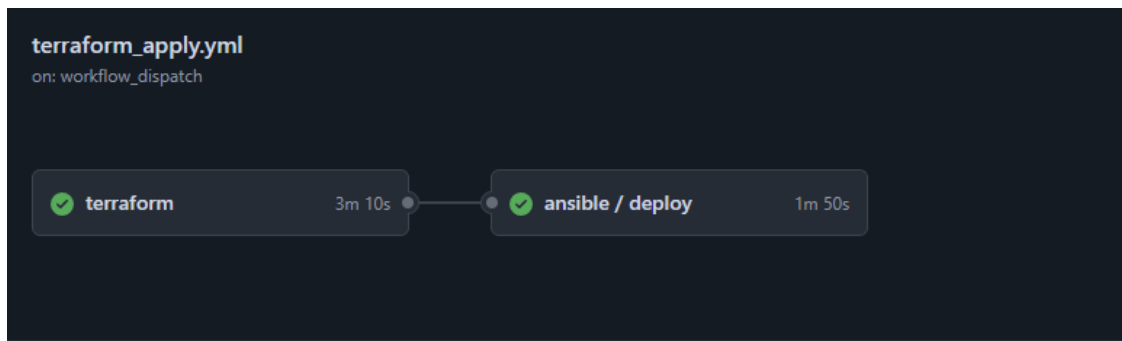


Figure 2: CI/CD Workflow (build images, publish to GHCR, provision with Terraform, bootstrap with Ansible, deploy with Helm).

The image shows a dark-themed modal window for configuring a GitHub Actions workflow trigger. At the top right, there is a button labeled "Run workflow" with a downward arrow. The modal contains several configuration fields:

- Use workflow from:** A dropdown menu showing "Branch: main".
- Branch to deploy \***: A text input field containing "main".
- SSH user on nodes (CL username) \***: A text input field containing "tg996676".
- Select CloudLab aggregate \***: A dropdown menu showing "emulab.net".
- Select hardware type \***: A dropdown menu showing "d710".

At the bottom of the modal is a green button labeled "Run workflow".

Figure 3: GitHub Actions workflow trigger (select branch, aggregate, hardware, SSH user; then run).

## 4 Infrastructure

### Why Terraform?

CloudLab experiments are short-lived: nodes are reserved, configured, and eventually released. Recreating the cluster manually is tedious and easy to get wrong. Terraform lets us:

- **Declare** the topology (nodes, links, LANs, routable IPs) once,
- **Reproduce** it reliably in CI,
- **Share** the exact spec for grading and collaboration.

This mirrors how production teams manage infrastructure but adapted to an academic testbed.

## Why our own Terraform provider

A community Go provider existed but talked to CloudLab via a separate Flask API running on localhost and focused mainly on VMs/VLANs. In CI, this meant two processes to manage and less flexibility for the experiments we wanted to describe.

We wrote a Go provider that talks to CloudLab's XML-RPC API *directly* and exposes the resource types we needed:

- Nodes: rawpc (bare metal), xenvm (VMs)
- Networking: lan, link, bridged\_link
- Storage: blockstore attachments
- Rich outputs: experiment UUID, URL, expiry, and a per-node map (used by Ansible)

This keeps CI simple (one workflow) and lets us declare the same experiments we'd build in the CloudLab UI, but as versioned HCL.

## Cluster layout (HCL)

Listing 1 shows the concise HCL we use most often (1 control plane + 2 workers on a shared LAN with routable IPs).

Listing 1: Terraform definition for Campus Connect cluster

```
resource "cloudlab_portal_experiment" "CC2-Cluster" {
  name          = "CampusConnect"
  wait_for_status = "ready"

  rawpc { name = "kubeadm", hardware_type = var.hardware_type,
    aggregate = local.aggregate_map[var.aggregate], routable_ip = true }

  rawpc { name = "worker1", hardware_type = var.hardware_type,
    aggregate = local.aggregate_map[var.aggregate], routable_ip = true }

  rawpc { name = "worker2", hardware_type = var.hardware_type,
    aggregate = local.aggregate_map[var.aggregate], routable_ip = true }

  lan {
    name = "lan0"
    interface { node = "kubeadm" }
    interface { node = "worker1" }
    interface { node = "worker2" }
  }
}
```

Provider and code: [Terraform Registry](#) [cc2-cluster GitHub](#)

## Provider internals (overview)

Internally, the provider registers a `cloudlab_portal_experiment` resource, validates the HCL (nodes, links, LANs, blockstores), and calls CloudLab's portal over XML-RPC. The provider returns outputs our pipeline needs (URL, node IPs, expiry).

*Short excerpt:*

Listing 2: Provider wiring (condensed)

```
func Provider() *schema.Provider {
  p := &schema.Provider{
    Schema: map[string]*schema.Schema{
      "project": {Type: schema.TypeString, Optional: true},
      "server":  {Type: schema.TypeString, Optional: true, Default: "boss.emulab.net"},
    },
  }
```

```

    "port": {Type: schema.TypeInt, Optional: true, Default: 3069},
    "path": {Type: schema.TypeString, Optional: true, Default: "/usr/testbed"},
    "pem_path": {Type: schema.TypeString, Optional: true, Default: "~/cloudlab.pem"},
    "timeout": {Type: schema.TypeString, Optional: true, Default: "10m"},
  },
  ResourcesMap: map[string]*schema.Resource{
    "cloudlab_portal_experiment": experiment.Resource(),
  },
}
p.ConfigureContextFunc = func(ctx context.Context, d *schema.ResourceData) (interface{}, diag.
  Diagnostics) {
  // Build XML-RPC client with TLS and return a typed config used by resources.
  ...
}
return p
}

```

## kubeadm bootstrap (Ansible)

After Terraform reports the experiment is ready, our workflow passes the node map to Ansible. The playbooks:

- install container runtime and kubeadm/kubelet,
- kubeadm init on the control plane and save the join token,
- kubeadm join both workers,
- install CNI (e.g., Calico) and core add-ons (NGINX Ingress, Metrics Server),
- configure MetalLB and ExternalDNS (below).

## MetalLB and ExternalDNS (deep dive)

CloudLab doesn't provide a managed load balancer, so Services of type LoadBalancer won't receive external IPs by default. We use **MetalLB** in L2 mode and **ExternalDNS** with Cloudflare:

### MetalLB (L2 mode).

- **Pool selection.** During deploy, Ansible detects the primary interface and node CIDR, then reserves a small, safe range at the tail of the subnet (e.g., .200–.220) for VIPs.
- **Assignment.** When a Service: LoadBalancer is created (e.g., NGINX Ingress), MetalLB allocates a VIP from the pool.
- **Advertisement.** Using ARP, MetalLB announces the VIP on the LAN so upstream hosts route traffic to the current node holding it.
- **Failover.** If that node fails, MetalLB remaps the VIP to another speaker; ARP updates propagate quickly.
- **Why L2 instead of BGP.** We don't control upstream routers in CloudLab, so L2 is the pragmatic choice on a shared LAN.

*Minimal values we apply (excerpt):*

Listing 3: MetalLB configuration (condensed)

```

apiVersion: metallb.io/v1beta1
kind: IPAddressPool
metadata: { name: default-pool, namespace: metallb-system }
spec: { addresses: ["10.10.1.200-10.10.1.220"] }
---
apiVersion: metallb.io/v1beta1
kind: L2Advertisement
metadata: { name: default, namespace: metallb-system }
spec: { ipAddressPools: ["default-pool"] }

```

## ExternalDNS (Cloudflare).

- Watches the cluster for Ingress/Service changes.
- Creates/updates records under `campusconnectwcu.com`.
- We use TXT ownership (`txtOwnerId`) to avoid conflicts and policy: `sync` for idempotent updates.
- In Cloudflare, we set these LB records to *DNS only* for L4 traffic.

*Minimal Helm values (excerpt):*

Listing 4: ExternalDNS (Cloudflare) values (condensed)

```
sources: ["ingress", "service"]
provider: cloudflare
cloudflare:
  apiToken: ${CLOUDFLARE_TOKEN}
domainFilters: ["campusconnectwcu.com"]
policy: sync
txtOwnerId: campusconnect
interval: 1m
```

Net effect: create an Ingress like `api.campusconnectwcu.com` → MetalLB assigns an IP → ExternalDNS publishes it. Nothing manual, even as experiments recycle.

## Security and ops notes

- Secrets (CloudLab PEM, Ansible Vault password, Cloudflare API token) are stored in GitHub Actions secrets.
- The Terraform job outputs a JSON node map; the Ansible job consumes that only for the current run.

Figure 4 shows the final cluster view after bootstrap and add-ons.

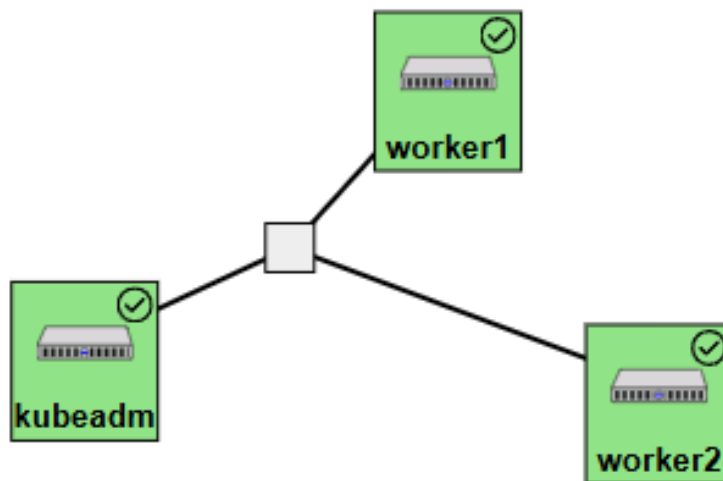


Figure 4: Campus Connect Cluster Infrastructure (post-bootstrap with Ingress, MetalLB, ExternalDNS).

# EDWIN PRITOM BISWAS

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## PROFESSIONAL SUMMARY

Profile/Professional Summary: Diligent worker with eight years of experience in the fast-food industry, seeking new and exciting opportunities. Works well both in groups and independently.

Adaptive under pressure, good at problem-solving, and interested in learning new things.

## WORK HISTORY

**Crew Member/Store Manager**, 02/2017 - Current

Dunkin Donuts, 2705 Edgemont Avenue, Brookhaven, PA 19015

Dunkin Donuts, 5101 Pennell Rd, Media, PA 19063

- Provided excellent customer service by greeting customers and meeting quality expectations.
- Took orders, prepared meals, and collected payments.
- Kept food preparation area, equipment, and utensils clean and sanitary.
- Worked front counter, drive-thru, and other areas.
- Assisted other team members in achieving goals.



Brookhaven, PA 19015



6102569965



Edo30025@gmail.com

## WEBSITES, PORTFOLIOS, PROFILES

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- <https://www.linkedin.com/in/edwin-biswas->

## SKILLS

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- Proficient in Customer Service.
- Well-versed in Individual and Mass communication.
- Experienced in Information management and modern technology.
- Experience with Windows in File Management and Networking.
- Documentation using Adobe and Microsoft Word, Excel, and PowerPoint.
- Experienced in managing money as a manager during the pandemic of 2020 and at current times.
- Product Promotion
- Time Management
- Workplace Efficiency



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## EDUCATION

**Bachelor of Science, Computer Science**, Expected in  
12/2025

West Chester University of Pennsylvania - 700 S High St,  
West Chester, PA 19383

GPA: 3.47

**Associate degree, Computer Science**, 12/2021

Delaware County Community College - Marple Campus 901  
S. Media Line Road Media, PA 19063

GPA: 3.79

# Alex M. Cooper Jr.

U.S. Citizen | [cooperjralex@gmail.com](mailto:cooperjralex@gmail.com) | (717) 693-9424 | Github: <https://github.com/AlexCooperJr>

## Education

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### West Chester University of Pennsylvania

West Chester, Pennsylvania

B.S. in Computer Science

Expected Graduation: Spring 2026

- **Related Coursework:** Computer Science III, Calculus, Discrete Mathematics, Statistics II, Data Structures and Algorithms, Computer Security, Computer Systems, Cloud Computing
- Placed second in the 2025 PACISE Cyber Security Competition
- Participated in the 7th and 10th Annual West Chester Programming Contest
- Spring 2024 Dean's List, Fall 2024 Dean's List, Spring 2025 Dean's List

## STEM Work Experience

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### Booz Allen Hamilton

Annapolis Junction, Maryland

Software Engineering Intern (Data Science)

June 2025-August 2025

- Implemented an AI model to perform knowledge graph(KG) completion methods to output inferences about entities and their relationships from text data, alongside other metrics from the graph.
- Developed a user interface(UI) to streamline the implemented processes of KG construction, modification, visualization, and completion.
- Utilize containerization best practices to make a complete deployable product for cloud or other devices. Contained the backend separate from the front for utilization of the model without the established UI.
- Presented research and implemented results to a group of interns, full time employees, leadership, and executives on a national stage.

### Statistics Tutor

West Chester, Pennsylvania

Peer Tutor

August 2024-Current

- Assisted students in either one on one or small group (less than 4) settings to work through topics from the Statistics I course at the West Chester University Learning Assistance and Resource Center (LARC)
- Covered topics including probability, confidence intervals, tests of hypothesis', and regression
- Reviewed material and developed individualized plans to ensure each student was able learn effectively and communicated between faculty, students, and peers to ensure continuity.
- Participated in training with the College Reading and Learning Association to be certified.

## Projects

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### Embedded Retrieval Augmented Generation (RAG) System

Lancaster, Pennsylvania

August 2025

- Utilized an embedding model and vector database to handle the conversion of text data from different pipelines into vectors then storage for future retrieval

- Leveraged prompt engineering to create a prompt which allowed a Large Language Model to answer questions with a higher accuracy and more relevant information by retrieving relevant documents from the database.
- Developed a simple user interface to allow for a non command line way to prompt the LLM and receive answers

### **Thermostat Project**

**Lancaster, Pennsylvania**

July 2024

- Programmed an Arduino UNO to take in input from a thermistor and display the temperature onto an Liquid Crystal Display(LCD), change a Tri-color LED to a corresponding color based on range, and start a DC motor depending on the registered temperature.
- Utilized the Arduino IDE to write code for communication between the arduino and components.
- Designed the circuit and implemented the appropriate techniques and components to regulate current outputs for protection of all components.

## **Technical Skills**

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**Languages:** Python, Java, HTML, JavaScript, CSS, C, C++, Haskell, React

**Libraries:** Pandas, Numpy, Matplotlib, scikit-learn, Java.util, next.JS, node.JS, networkX

**Environments/Tools:**Thonny, BlockPy, jGRASP, Visual Studio Code, GitHub,Arduino IDE,CloudLab, Docker, fastAPI, wireshark

## **Non-Technical Work Experience**

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### **Valvoline Instant Oil Change**

**Lancaster, Pennsylvania**

Senior Technician

May 2022-August 2024

- Supervised a team of employees to ensure speed of service, quality work, and safety.
- Interacted with suppliers to ensure supplies and resources were properly managed and available.
- Used a variety of new technologies, and industry standards to perform a number of roles during vehicle servicing.
- Kept track of and issued disciplinary files and ensured accountability for team members.

### **Resident Assistant Internship and Leadership Exploration(RAILE)**

**Newark, Delaware**

Intern/Mentee

February 2023-May 2023

- Attended a variety of professional workshops that addressed issues commonly seen in work places and resident halls.
- Received on-site training and met with a mentor to build and develop characteristics of a leader.
- Helped coordinate and host events to engage with members of the community.

# Tyler Geiger

West Chester, PA | tygg513@outlook.com | 267-500-7205 | [linkedin.com/in/tyler-geiger](https://linkedin.com/in/tyler-geiger)

[github.com/TylerGeiger513](https://github.com/TylerGeiger513)

## Profile

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Cloud-focused software engineer with experience deploying applications and infrastructure on AWS, Azure, and research-grade platforms. Skilled in Kubernetes, Terraform, and CI/CD automation, with a focus on building reproducible, scalable environments. Experienced in Agile teams, taking ownership of technical challenges, and contributing to both enterprise and academic projects.

## Education

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**West Chester University of Pennsylvania**, BS in Computer Science, Minor in Applied Statistics, Certificate in Cloud Engineering Sept 2022 – May 2026

- GPA: 3.52/4.0
- **Deans List:** Spring 2024, Fall 2024, and Spring 2025
- **Relevant Coursework:** Cloud Computing I & II, Software Engineering, Operating Systems, Modern Web Applications, Data Communications & Networking, Database Management Systems, Computer Security & Ethics, Programming Languages & Paradigms, Data Structures & Algorithms, Experimental Design, Applied Statistics

## Experience

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**Software Developer Intern**, iPipeline – King of Prussia, PA June 2025 – Aug 2025

- Migrated six carriers from Jenkins to GitHub Actions by upgrading frameworks, modernizing package references, and validating builds.
- Developed scripts to automate NuGet updates and accelerate local workspace setup and testing with parallelization.
- Transitioned multiple proprietary web services from TRX servers to AWS Lambda Functions and contributed to Terraform-based deployments for consistent Sandbox, QA, UAT, and Production environments.
- Worked within an Agile team, collaborating across roles to troubleshoot issues, implement requested features, and ensure reliable delivery for clients.

**Copyright Office – Temporary Employee**, ASTM International – Conshohocken, PA Dec 2022 – Present

- Successfully registered over 5000 of ASTM's published literary works with the U.S Copyright Office through the ECO system.
- Developed an automation for the process above using Node.js, the XLSX library, and a Copyright Public Records API. This reduced a previously week-long, sometimes multi-week manual process into an automated process that can be configured and executed in a single day, significantly improving efficiency.
- Developed numerous ease-of-use automations and shortcuts utilizing Excel Office scripts and Windows PowerShell, significantly improving workflow efficiency, and simplifying tasks for my supervisor.

**IT Operations – Temporary Employee**, ASTM International – Conshohocken, PA June 2023 – Aug 2023

- Populated the Application Portfolio Management (APM) system by conducting interviews with IT team members and documenting application dependencies, subject matter experts, and infrastructure components across DEV, QA, and Production environments.
- Standardized and organized metadata for dozens of enterprise applications to improve visibility, support planning, and enhance future maintenance efforts.

## Projects

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**Campus Connect** – Full-Stack Kubernetes Application on Research Cloud Infrastructure

[github.com/campusconnectwcu/cluster](https://github.com/campusconnectwcu/cluster)

- Collaborated with a team to design and deploy a full-stack academic communication platform using NestJS and

MongoDB, containerized with Docker and orchestrated via Kubernetes and Helm.

- Configured a production-grade environment on the CloudLab research testbed, implementing DNS, SSL certificate management, and NGINX ingress routing for secure, scalable access.
- Automated image builds, designed repeatable infrastructure, and cluster deployments through GitHub Actions, Docker registry workflows, and Keel for continuous delivery and image version tracking.
- Engineered Helm charts, Kubernetes secrets management, and repository split strategies to optimize CI/CD pipelines and development workflows.
- Authored documentation to ensure reproducibility, scalability, and future academic research reference.
- **Tools Used:** NestJS, MongoDB, React, Redis, Docker, Kubernetes, Helm, Keel, GitHub Actions, Terraform, Skaffold, NGINX, CloudLab.

**Portalctl** – Go CLI for CloudLab/Emulab XML-RPC (WIP)

[github.com/CSC478-WCU/portalctl](https://github.com/CSC478-WCU/portalctl)

- Implemented a Go command-line utility to manage CloudLab experiments via Emulab XML-RPC, covering full lifecycle operations: start, status, modify, terminate, extend, manifests, reboot, connect, and disconnect.
- Added reproducible parameterization with `-bindings/-bindings-file` and repeatable `-param k=v` flags, plus JSON status output (`-j`) and configurable timeouts for CI usage.
- Built TLS client-auth support (PEM cert/key) and cross-platform builds; documented usage and examples for fast onboarding.
- Designed to pair with Terraform/CI pipelines for research testbed deployments (e.g., parameterized profile launches, profile modification, extends, node reboots).
- **Tools Used:** Go, XML-RPC, TLS/PEM, CloudLab/Emulab.

**Web Development Volunteer**, Chester County Association for the Blind and Visually Impaired (CCABVI)

Sept 2024 – Dec 2024

- Collaborated with a team on a website accessibility enhancement project, implementing UI/UX improvements and features designed to meet ADA Section 508 compliance standards for blind and visually impaired users.
- Diagnosed and resolved technical issues, including a broken PayPal donation integration and misconfigured WordPress hosting setup.
- Took a leadership role in front-end development and coordinated team communication to ensure timely delivery of improvements.

## Technologies

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**Languages:** JavaScript/TypeScript, Go, Python, SQL, Bash, PowerShell

**Cloud & Infrastructure:** AWS (Lambda, ParamStore, CloudWatch), Azure (CLI, AKS, ACR), Kubernetes, Docker, Helm, Skaffold, NGINX, Keel, CloudLab/Emulab

**DevOps & IaC:** Terraform, Terragrunt, GitHub Actions, Octopus Deploy, CI/CD Pipelines, Secrets Management

**Frameworks & Tools:** .NET, NestJS, Node.js, Postman, Jest, MySQL, MongoDB, Git/Github

**Specialties:** Infrastructure-as-Code, Automation Scripting, API Development, Accessibility/ADA 508 Compliance, Cloud-Native Deployment Strategies

# Kadin Matotek

302-723-2182 | [kadinmatcs@gmail.com](mailto:kadinmatcs@gmail.com) | [linkedin.com/in/kadin-matotek](https://www.linkedin.com/in/kadin-matotek) | [github.com/kmatotek](https://github.com/kmatotek)

## EDUCATION

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### Strath Haven High School

*High School Diploma*

Wallingford, PA

*Graduation: 5/2022*

- Clubs and Organizations: Ice Hockey, Track and Field, and Soccer.
- Relevant Coursework: Computer Science Principles

### West Chester University of Pennsylvania

*B.S. in Computer Science, Minor in Mathematics*

West Chester, PA

*Expected Graduation: 5/2026*

- GPA: 3.94/4.0
- Clubs and Organizations: Upsilon Pi Epsilon, Omicron Delta Kappa, Club Ice Hockey
- Relevant Coursework: Artificial Intelligence, Data Structures & Algorithms, Operating Systems, Computer Security, Software Engineering, Cloud Computing, Applied Statistics, Linear Algebra, Discrete Mathematics, Multivariable Calculus

## PROJECTS

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### Email Classifier | *Java*

Oct 2023

- Achieved 89% prediction accuracy in distinguishing legitimate emails from spam across a dataset of 5,000 emails by calculating distances between individual emails and clusters.
- Implemented Java GUI enabling users to assess email authenticity and calculate distances between individual emails and/or email groups.
- Integrated a range of classification techniques, including nearest neighbors and Euclidean distance calculations, to improve adaptability and strengthen analytical precision.

### Happy Programming Language | *Java*

Nov 2024

- Designed and developed “Happy”, a custom programming language featuring support for variable assignments, conditional expressions, loops, functions, list operations, and string formatting, aimed at providing a clean and concise syntax compared to other common programming languages.
- Documented the development and syntax through knowledge base documentation, allowing for anyone to learn the syntax, built in functions, and everything needed to know to start developing with this language.

### 2D Unity Game | *C#, Unity*

Oct 2023

- Developed a 2D video game inspired by *The World's Hardest Game*, incorporating challenging level design and precise player controls.
- Designed and implemented multiple levels with increasing difficulty to test players' reflexes and problem-solving skills.
- Conducted play-testing to refine game mechanics and enhance user experience based on feedback.

### 3D Unity Game | *C#, Unity*

Nov 2023

- Developed a 3D game incorporating custom graphics, custom player scripts, and realistic physics simulations in outer space.
- Developed multiple levels, presenting players progressively challenging obstacles to overcome, ensuring continuous skill progression.
- Conducted user testing to get feedback and implemented improvements through updates.

### Facial Recognition | *Python*

Feb 2024

- Engineered a real-time face recognition program achieving over 90% accuracy on a structured dataset, providing efficient visual identification.
- Integrated advanced facial detection and recognition algorithms, utilizing libraries to detect and recognize faces in diverse environments.

EXPERIENCE

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<b>Research Assistant</b> <i>West Chester University of Pennsylvania</i>	Feb 2025 – Present <i>West Chester, PA</i>
<ul style="list-style-type: none"><li>• Awarded \$2,500 research grant as the only Computer Science student accepted into SURF</li><li>• First author of an AI research paper submitted to CCSCE, rated highest among all conference submissions</li><li>• Built multi-model pipelines using Ollama and Hugging Face, leveraging reprompting and chain-of-thought techniques to enhance AI model performance</li><li>• Leveraged the ACCESS supercomputing center to run large-scale jobs efficiently, enabling rigorous testing of modern LLMs beyond typical hardware constraints</li><li>• Collaborated with Dr. Ngo on research initiatives aimed at evaluating AI model performance and optimizing testing methodologies</li></ul>	
<b>D.P. Dough West Chester</b> <i>Delivery Driver</i>	Mar - Aug 2023 <i>West Chester, PA</i>
<ul style="list-style-type: none"><li>• Executed over 1,000 customer deliveries with a strong focus on optimizing delivery routes, resolving logistical challenges, and ensuring timely, accurate order fulfillment through advanced problem-solving techniques.</li><li>• Utilized problem-solving skills to streamline order management processes and provide customer service.</li><li>• Took orders, served customers, addressed inquiries, resolved any issues to ensure the best customer experience.</li></ul>	
<b>Vicky's Place</b> <i>Dish Washer</i>	Jun - Jul 2021 <i>Swarthmore, PA</i>
<ul style="list-style-type: none"><li>• Assisted kitchen staff by ensuring a steady supply of clean cookware and dishware during peak hours.</li><li>• Maintained a fast-paced and organized dishwashing station to support smooth kitchen operations.</li><li>• Trained new employees on proper dishwashing procedures, safety protocols, and kitchen cleanliness standards to ensure consistency and efficiency.</li></ul>	
<b>Fort Delco Gym</b> <i>Gym Custodian</i>	Jun - Jul 2020 <i>Morton, PA</i>
<ul style="list-style-type: none"><li>• Maintained cleanliness and sanitation of workout areas, locker rooms, and equipment to ensure a safe and hygienic environment for both members and staff.</li><li>• Conducted routine inspections to identify and address maintenance or cleanliness issues promptly.</li><li>• Collaborated with staff to uphold gym standards and provide a positive experience for members.</li></ul>	
<b>Open Sky Energy</b> <i>Social Media Manager</i>	Aug - Nov 2019 <i>Swarthmore, PA</i>
<ul style="list-style-type: none"><li>• Collaborated with the team to develop marketing strategies and improve social media outreach.</li><li>• Developed and scheduled posts to promote solar energy solutions, company updates, and customer success stories.</li><li>• Managed and created content for the company's social media platforms, increasing engagement and brand visibility.</li></ul>	

VOLUNTEERING

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<b>Media Food Bank</b> <i>Volunteer</i>	Mar - Aug 2023 <i>Media, PA</i>
<ul style="list-style-type: none"><li>• Assisted customers by taking food orders and providing a welcoming, supportive environment.</li><li>• Retrieved and organized food items based on customer orders to ensure accuracy and efficiency.</li><li>• Worked collaboratively with volunteers and staff to maintain smooth food distribution operations.</li></ul>	

PUBLICATIONS

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**K. Matotek**, H. Cassel, M. Amiruzzaman, L. B. Ngo. *Evaluating the Limitations of Local LLMs in Solving Complex Programming Challenges*. arXiv preprint, 2025. [arxiv.org/abs/2509.15283](https://arxiv.org/abs/2509.15283)

TECHNICAL SKILLS

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**Proficient Languages:** Java, Python  
**Familiar Languages:** JavaScript, C#, R, SQL, Haskell, LaTeX, HTML, CSS  
**Developer Tools:** Docker, Git, Linux, Zsh, Redis, MongoDB, Spring Boot, Unity, Ollama, Hugging Face