Erick Shepherd

Curriculum Vitae

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Professional Summary

Full-stack software engineer experienced in complex software development across enterprise applications, scientific Python software, and AI developer tools. Delivered healthcare quoting and contract-generation systems, database performance improvements, and an Oracle integration used by colleagues with Claude and Cursor. Combines enterprise delivery with scientific research, teaching, and personal AI systems and open-source projects.

Work Experience

Application Development Advisor

Cigna Supplemental Health Services

Location: Remote

August 2021 - May 2026

- Full-stack software engineering contract assignment through Magnit Global; fully remote.
- Maintained and extended an inherited field-quoting application as its sole developer, building user interfaces with Oracle APEX, JavaScript, jQuery, and HTML/CSS and backend logic with PL/SQL for sales, pricing, and underwriting teams.
- Built a locally running, credentialed Python utility, also used by other developers, through which Claude and Cursor Composer interfaced with enterprise Oracle databases; co-produced dependency maps with another developer across more than 15 applications and hundreds of database objects.
- Gathered requirements directly from business users early in the engagement; later implemented requirements coordinated by the product team.
- Designed and implemented a product pricing engine with historical rate-version support, enabling legacy and new quotes to remain accurate as rates changed.
- Directed development of a downstream contract-generation product, coordinating four other developers through task delegation, code reviews, and technical direction.
- Improved document-generation performance from more than 30 seconds to under one second by rewriting Oracle query logic to eliminate PL/SQL-to-SQL context switching.
- Established Git/GitHub source control, branching conventions, and review workflows while administering 29 repositories and adapting delivery practices to evolving team needs.
- Co-designed the team's first Jenkins CI/CD pipeline architecture and led integration of the Oracle APEX deployment workflow.
- Built automated tests for Oracle APEX and PL/SQL, deployment utilities, environment checks, and a Python package with a custom DSL for ordered database-object compilation; added a VS Code syntax-highlighting extension for the DSL.
- Developed an OCR-backed ETL pipeline for inconsistently structured pricing spreadsheets, including rate tables embedded as images.
- Implemented data visualization through interactive Oracle APEX dashboards, computed business metrics, and templated Excel reporting with PL/SQL and Apex Office Print to support sales and pricing decisions.

Systems and Embedded Software Engineer

Self-employed

Location: Maryland

December 2020 - April 2024

- Part-time freelance engineering work in a hybrid arrangement.
- Developed C/C++ firmware and Python software for IoT security-device prototypes, integrating sensors, serial communication, and Linux-based control software across evolving hardware and software requirements.
- Designed and hand-soldered more than two dozen prototype circuit boards, supporting device debugging and controlled field experiments.
- Co-developed a Dockerized FastAPI and PostgreSQL prototype backend for device telemetry; implemented endpoints, database operations, request validation, and error handling, and manually tested requests and database results.
- Delivered scientific data-engineering work using NOAA satellite and reanalysis datasets, BigQuery, netCDF, pandas, and cartopy; implemented humidity calculations and geospatial analyses for a client's doctoral research.

Radar Systems Engineering Intern

Northrop Grumman Mission Systems

Location: Remote

June 2020 - May 2021

- Translated software between languages, analyzed the original implementation, compared behavior and outputs, and documented changes and differences.
- Contributed to defense systems-engineering processes, technical documentation, and cross-functional engineering workflows.
- Previously held DoD Secret clearance during 2020-2021.

Research Intern

NASA Goddard Space Flight Center

Location: Greenbelt, MD

June 2019 - December 2019

- Selected for the NASA Sally Ride Internship, sponsored by the Science Mission Directorate; received a four-week funded summer extension and continued with the Dark Target group through an autumn internship.
- Developed a cross-platform Python AERONET data-retrieval tool usable from the command line or as an imported module, improving access to ground-based aerosol observations.
- Reimplemented the IDL CONGRID interpolation routine in Python, with support for multidimensional and geospatial data; removed a proprietary IDL dependency from the research workflow.
- Named as co-inventor on two NASA New Technology Reports filed in July 2019 for the AERONET and CONGRID tools.
- Profiled Python CONGRID/SciPy interpolation while resampling satellite imagery from 2 km to 1 km; used timing experiments to investigate interpolation and file-I/O bottlenecks.
- Compared NCEP meteorological datasets using Python/pygrib, producing difference maps and technical reports to evaluate forecast inputs for aerosol retrieval.
- Found forecast meteorological fields to be a suitable substitute for older analysis fields in near-real-time aerosol retrieval; presented results at the AGU Centennial Fall Meeting.
- Presented work on validation and algorithm improvement for the MODIS Dark Target aerosol product at the NASA summer intern poster session. Research supervisor: Dr. Robert Levy.

Teaching Assistant

University of Maryland, Baltimore County

Location: Baltimore, MD

January 2019 - May 2019

- Computational physics teaching appointment in the Department of Physics.
- Supported Introduction to Computational Physics through project grading, office hours, and lectures when the instructor was unavailable.
- Taught Python, NumPy, Matplotlib, Monte Carlo methods, numerical integration, root finding, linear algebra, least-squares fitting, and differential equations.
- Developed a Monte Carlo cloud-radiative-transfer simulation as a student and subsequently assessed other students' implementations as a teaching assistant.

Research Intern

NASA Goddard Space Flight Center

Location: Greenbelt, MD

June 2018 - August 2018

- Advanced Computing for Earth Sciences research internship in the Climate and Radiation Laboratory.
- Investigated poleward aerosol transport using CATS lidar observations from the International Space Station and CALIPSO satellite data.
- Aggregated CATS lidar observations seasonally into 60-meter vertical bins and 2-degree geographic grids; analyzed backscatter and depolarization measurements and presented findings at the NASA summer intern poster session.
- Undertook the research placement after the University of Virginia ACES computing intensive. Research supervisor: Dr. Hongbin Yu.

Teaching Assistant

University of Maryland, Baltimore County

Location: Baltimore, MD

January 2018 - May 2018

- Computational physics teaching appointment in the Department of Physics.
- Supported Introduction to Computational Physics through project grading, office hours, and lectures when the instructor was unavailable. Taught Python and numerical methods.

Research Assistant

University of Maryland, Baltimore County

Location: Baltimore, MD

August 2017 - June 2020

- Research appointment in the Department of Physics, ACROS Group.
- Conducted atmospheric remote-sensing and scientific-software research under Dr. Zhibo Zhang, including NSF-supported CyberTraining work on discrepancies between MODIS and CALIOP cloud observations.
- Developed nearest-neighbor collocation of cloud and sea-ice observations; the team's analysis found that about half of the tested over-water cloud anomalies coincided with high sea-ice concentrations.
- Built a modular Python package for CATS data download, HDF5 ingestion, filename filtering, observation-frequency maps, and atmospheric vertical cross-sections.
- Wrote and submitted SLURM batch scripts and compared serial and distributed MODIS aggregation across increasing HPC node counts using Apache Spark; also used NumPy, SciPy, scikit-learn, and mpi4py in research and analysis.

- Introduced Git/GitHub workflows and delivered two training sessions, An Introduction to GitHub and Git on Taki, in June 2020; the group's public repository workflow persisted after the appointment.
- Participated in NSF-supported hourly research from fall 2019 and CyberTraining coursework and team research in spring 2020.

Co-Founder and Chief Operations Officer (Self-employed)

Industrial Commons, Inc.

Location: Hagerstown, MD

September 2015 - December 2017

- Co-founded a nonprofit community makerspace of approximately 20 members; managed daily operations, its website, and community activities.
- Led Python, Raspberry Pi, 3D-printing, and design workshops, and supported science demonstrations with a local museum.

Pharmacy Service Associate / Pharmacy Technician

CVS Health

Location: Walkersville, MD

September 2013 - September 2017

- Managed prescription intake and workflow triage, entered patient and prescription information, and processed insurance claims.
- Prepared prescriptions under pharmacist supervision, including counting and labeling medications; served customers at drop-off, drive-through, and point-of-sale.
- Managed pharmacy inventory and regularly placed replenishment orders through Cardinal.
- Provided coverage at other pharmacies throughout the district as needed.
- Earned Maryland pharmacy technician licensure and PTCB Certified Pharmacy Technician (CPhT) certification; completed continuing education through Pharmacy Technician's Letter.

Social Media Coordinator

Own the Room

Location: Remote

May 2012 - May 2013

- Remote role with Own the Room, formerly Blue Planet Training.
- Created and scheduled social media content, responded to followers, and tracked engagement to assess content performance.

Dishwasher

Aramark

Location: Frederick County, MD

March 2012 - September 2013

- University dining assignment at Mount Saint Mary's University.
- Washed and sanitized dishes, utensils, and kitchen equipment used in university dining service for students and faculty.
- Returned clean dishes to service areas and kept the dish room clean and organized.

Education

Undergraduate study in Physics (degree not conferred)

University of Maryland, Baltimore County

Location: Baltimore, MD

Attended August 2015 - December 2021

- Coursework: PHYS 650 (Big Data, High-Performance Computing, and Atmospheric Sciences), computational physics, senior research, C++ object-oriented programming, discrete mathematics, statistical physics, and Electronics for Scientists.
- CyberTraining coursework: built Spark MLlib classification pipelines using random forests, logistic regression, and support-vector machines, with cross-validation and parameter search; trained and evaluated a Keras neural network.
- Electronics laboratory work included CircuitLab simulations, RC/RLC filters, op-amp and timer circuits, and digital logic; documented measurements, oscilloscope captures, and uncertainty analysis in laboratory reports.

Associate of Science in STEM, High Honors

Frederick Community College

Location: Frederick, MD

August 2011 - May 2015

- GPA: 3.8/4.0. Honors College Gold Medal awarded for High Honors.
- Completed two computer science courses taught in Java; collaborated on a graphical polynomial calculator as an additional academic assignment.
- Completed linear algebra, multivariable calculus, differential equations, and MATLAB; wrote MATLAB functions for numerical integration and exponential growth/decay calculations.

Technical Skills

- LLM tool integration and internal developer tooling: locally running Python utilities enabling Claude and Cursor Composer to work with enterprise Oracle databases; Model Context Protocol (MCP) integrations; prompt engineering.
- AI development and workflows: agent workflow design, task delegation and human oversight; reusable agent skills; custom GPT configuration and evaluation; prompt testing; conversational workflow design; context management; code review and output verification; deterministic tool-use guardrails with Claude Code hooks; responsible AI, data-handling safeguards and automation suitability assessment.
- File-based retrieval-augmented generation (RAG) and context engineering: task-directed retrieval from structured career files and primary sources to ground generated documents.
- Application development: Oracle APEX, Oracle Database, PL/SQL, SQL query tuning, JavaScript, HTML/CSS, jQuery, React, PHP, Astro, Flask routing and request handling, server-sent events, reporting, Excel automation and Apex Office Print.
- Python and data engineering: pandas, NumPy, SciPy, multiprocessing, requests, oracledb, OCR with pytesseract, FastAPI, PostgreSQL, SQLite, BigQuery, SQLAlchemy, Pydantic, Django, relational database design, ETL, exploratory data analysis, data cleaning and preprocessing.
- Scientific data and machine learning: HDF4/HDF5, netCDF, Cartopy, Matplotlib, satellite remote sensing, SLURM, PySpark and mpi4py; scikit-learn, Spark MLlib, Naive Bayes, logistic regression, model calibration, model evaluation and hyperparameter tuning; TensorFlow/Keras.

- Developer tooling: Git, GitHub Actions, Python packaging/Poetry, pytest, regression, fuzz and differential testing; acceptance-test-driven development; Jenkins CI/CD co-design; Docker/Linux, Azure cloud fundamentals, VS Code extensions, compiler/parser development, AST-based static analysis, LSP and DAP; TypeScript.
- Programming and instruction: object-oriented programming, Tkinter, wxPython, command-line applications, socket programming, computational physics teaching, programming workshops, AI-literacy instruction and assessment design.
- Embedded systems: C/C++, Python, Arduino tooling, custom PCB design, EasyEDA, soldering, sensor integration, UART debugging and TCP/IP communication.
- Additional languages and tools: Rust, PyO3/Maturin native extensions, Cython, binary file-format parsing, Java, MATLAB, Fortran, LaTeX, Jupyter, Blender Python/procedural geometry, Godot and GDScript.
- Security and investigation: AI red teaming, Nmap/Zenmap, Kali Linux, Scapy packet inspection, password-breach dataset analysis, digital forensics, disk imaging and deleted-file recovery, Fernet authenticated encryption.
- Scientific computing and mathematics: numerical methods, linear algebra, multivariable calculus, differential equations, discrete mathematics, curve fitting, interpolation, Monte Carlo simulation, uncertainty analysis and error propagation.
- Electronics and instrumentation: circuit analysis, CircuitLab, analog electronics, digital logic, oscilloscopes, digital multimeters and function generators.

Projects

AI Systems and Developer Tools

Project: Gestalt. Multi-provider AI workspace and agent orchestration | Personal project in active development | AI-assisted development, 2026.

- Architected and directed implementation across six repositories: MCP provider execution, Python orchestration, React messaging, Rust/Tauri desktop, a Kotlin Android companion prototype, and offline training/evaluation tooling.
- Developed persistent AI persona and group conversations with reusable prompt skills; separated presentation, orchestration, and provider execution so prompt instructions do not grant tool permissions.
- Designed workflow selection around policy, evidence, cost, and latency, plus offline intake-model evaluation with dataset provenance and separate training, calibration, and held-out evaluation data.
- Implemented immutable execution plans, capability and billing checks, permission revocation, cancellation, and durable execution receipts; uncertain outcomes remain unresolved to prevent unsafe retries.
- Directed adversarial review and local testing of protected credential storage and restart recovery, including a Windows process-death demonstration using simulated provider execution without duplicate dispatch.
- Directed implementation of SQLite transactions and schema migrations, server-sent-event response parsing, and offline Naive Bayes/logistic-regression training and calibration.

Project: excubitor. Controls for autonomous coding agents | AI-assisted development, 2026.

- Architected opt-in policy hooks for selected file-edit and Git operations, including checks against protected branches and destructive commands.
- Connected intended behavior to explicit, testable claims and external checks so completion decisions can be evaluated against evidence.
- Archived software release v0.2.0 on Zenodo, July 2026.

Software archive: https://zenodo.org/records/21499869

Project: did-it. Coding-agent claim verification | AI-assisted development, 2026.

- Architected a deterministic checker for supported procedural claims in Claude Code session transcripts, with verdicts linked to recorded evidence.
- Abstains when claims or transcripts cannot be evaluated; verification uses explicit rules rather than another language model.
- Added adversarial synthetic evaluation cases, mutation operators, and CI gates for incorrect accusations and endorsements; keeps evaluation scope and limitations explicit.

Source: https://github.com/ErickShepherd/did-it

Software archive: https://zenodo.org/records/21481652

Project: LLM Guidance Routing and Evaluation. Experimental prompt-guidance router and evaluation harness | AI-assisted development, 2026.

- Designed a deterministic Python router that selects portable prompt-guidance modules within dependency and context-budget constraints and produces reviewable provider-specific bundles.
- Developed controlled LLM comparisons with frozen criteria, held-out cases, and call budgets; retained a negative result in which structured revision did not outperform the simpler baseline.

Project: Source-derived architecture diagrams. Personal developer tool | AI-assisted development, 2026.

- Developed repo-cartographer to extract relationships from tracked source files and generate Mermaid architecture diagrams and structured JSON graphs.
- Added comparison against committed diagrams, with an optional strict check that fails when the diagram differs from the current source.

Project: Agent-assisted workflow platform. Personal project | AI-assisted development, 2026.

- Designed a Python workflow spanning multi-provider data ingestion, record normalization, document generation, mailbox classification, and browser automation.
- Integrated Model Context Protocol tools with explicit human review gates and deterministic content checks.
- Implemented an operating-system credential broker that fills authenticated browser forms while keeping password values outside the language model's context.

Project: Jarvis and speech-data pipelines. Personal projects; Jarvis currently requires recovery and repair | AI-assisted development, 2026.

- Built a voice-assistant pipeline connecting wake-word detection, speech recognition, streamed language-model responses, Model Context Protocol tools, and speech synthesis.
- Documented live Claude-backed voice sessions, including a multi-speaker session, with permission checks and lifecycle monitoring; current code requires recovery and revalidation.
- Developed a separate audio-data preparation pipeline applying audio signal processing for loudness normalization and voice-activity segmentation, with transcription, dataset curation, and configurable XTTS-v2 speech synthesis.

Scientific and General Purpose Software

Project: MODIS-CALIOP Anomaly Analysis. Collaborative research software | UMBC ACROS / CyberTraining Team 2, 2020.

- Contributed to software investigating discrepancies between MODIS Aqua and CALIPSO cloud observations with Olivia Norman and Christine Abraham; repository includes anomaly mapping, sea-ice analysis, cloud three-dimensional effects analysis, figures, and results.

Source: https://github.com/ErickShepherd/modis_caliop_anomaly_analysis

Project: ncarnate. Scientific data conversion and preservation | Rebuilt and published, 2026.

- Developed a Python converter for legacy HDF4/HDF-EOS2 satellite data and verified recompression of netCDF/HDF5 files.
- Reconstructs CF geolocation metadata, projected grids, and swath coordinates using an Earth-centered coordinate representation for interpolation.
- Verifies converted output against source values before replacement. Published on PyPI and conda-forge.
- Added provenance-tracked fixtures from scientific granules and comparison tests against an independent HDF conversion; the full-grid reference check requires local raw data.

conda-forge package: https://anaconda.org/conda-forge/ncarnate

Project: cosmic-crunch. Satellite sounding acquisition and conversion | Modernized, 2026.

- Built command-line tooling to retrieve JPL GENESIS COSMIC radio-occultation profiles and convert ASCII soundings to netCDF4.
- Modernized the research utility with packaged installation, multiprocessing, logging, automated tests, and release workflows.

Project: noaa-gml-file-reader. Atmospheric trace-gas data ingestion | Modernized, 2026.

- Developed a Python reader that converts NOAA Global Monitoring Laboratory observatory files into pandas DataFrames.
- Supplied the original reader to an atmospheric researcher in March 2020, using sample files provided through the collaboration.
- Added support for multiple header conventions and explicit rejection of unrecognized input, with tests and package distribution.

Project: pydlock. File-encryption library and command-line tool | Modernized, 2026.

- Developed a Python encryption/decryption utility for interactive command-line and library use.
- Modernized the format with salted scrypt key derivation, authenticated encryption, and a versioned file envelope; retained compatibility with earlier files.
- Added malformed-input handling, tests, and approval-gated publishing through GitHub Actions and PyPI Trusted Publishing.

Project: More Languages for Adobe Brackets. Editor extension | JavaScript and CodeMirror.

- Published an extension adding syntax highlighting and comment shortcuts for 19 languages, including Fortran, COBOL, Julia, R, and Swift.
- More than 3,000 recorded downloads in the legacy Brackets extension registry.
- Distributed through the former Brackets extension registry; the successor ecosystem later carried the extension into its package infrastructure.

Programming Community Contributions

- Contributed Python explanations and debugging help on Stack Overflow, including object-oriented programming and command-line file processing.

Additional Projects

Project: Service Operations Map. Pro bono project | Adopted by a local service business.

- Built a touchscreen map from spreadsheet records, with service-status filters, pricing zones, site details, and geographic overlays.
- Automated nightly data cleaning, address geocoding, and map refresh using Python, pandas, Folium, geopy, and openpyxl.
- Repurposed an existing display with a touch overlay; the business adopted the system in place of a manually maintained wall map.
- Implemented cached, confidence-scored geocoding, address normalization, layered map views, and Excel reporting utilities.

Project: Swan-Song. Team hackathon project | hackUMBC, Fall 2019.

- Established the team GitHub repository and wrote a substantial portion of the Python code, including MIDI sound generation using two normal distributions and a specified time signature to produce melody-like output.

Project: https://devpost.com/software/swan-song

Source: https://github.com/ErickShepherd/Swan-Song

Project: Programming language and developer toolchain. Personal project | AI-assisted development, 2026.

- Designed and implemented an English-phrase programming language with a custom lexer, recursive-descent parser, Python AST generation, and declaration and scope checks.
- Developed reverse translation from Python, coverage tooling, and a debug adapter that maps source breakpoints and stack frames over debugpy, with VS Code integration.

Project: Game-authoring and 3D asset pipelines. Personal prototypes | AI-assisted development, 2026.

- Developed a validated DSL-to-Godot authoring pipeline for generated game projects, with deterministic compilation and acceptance checks.
- Developed content-addressed storage and lockfile-based resolution for generated 3D assets, using Python and headless Blender processing.

Project: Service-management web application. Pro bono prototype | Unfinished; not deployed.

- Developed Django relational models, database migrations, and URL-routed HTTP views for a proposed replacement for spreadsheet-based service records, using SQLite during development.

Project: Infrastructure and technical-writing projects.

- Operated self-hosted Linux services using Docker, GitLab, reverse proxies, and monitoring tools; configured multi-domain web and email hosting.
- Diagnosed email-delivery failures and corrected SPF, DKIM, DMARC, and reverse-DNS configuration across more than a dozen domains.
- Prepared homework solutions and whitepapers / technical papers in LaTeX.
- Directed AI-assisted development of an Astro website and PHP inquiry backend with request validation, rate limiting, idempotency and verification checks.

Project: Web and Android planning application. Personal TypeScript application | AI-assisted development, 2026.

- Implemented validated data snapshots, durable caching, explicit stale-data provenance, and readiness checks for a web and Android application.
- Developed container hardening, SQLite backup staging, and signed release and rollback verification; recorded unit, browser, and device checks.

Project: Graphical polynomial calculator. Java academic project | Frederick Community College.

- Collaborated with a classmate to develop a graphical calculator application for polynomials alongside Java computer science coursework.

Project: Rust scientific-format parser. HDF4 subset parsing and Python native extensions | AI-assisted development, 2026.

- Architected and directed a Rust parser for a documented read-only subset of HDF4, with Python bindings through PyO3 and Maturin.
- Added bounded fuzz targets and differential comparisons for parser behavior and malformed inputs; the project remains pre-alpha, with no complete HDF4-compatibility claim.

Project: Embedded-device investigation. Independent investigation, October 2023.

- Used Nmap/Zenmap to identify exposed services and inspected embedded Linux processes and network state through Telnet.
- Acquired SD-card images and used Disk Drill to inspect recovered media and export a deleted thumbnail; retained technical notes and a brief findings summary.

Project: Python interfaces and security experiments. Educational and experimental work.

- Built Tkinter canvas animation and keyboard controls, and Python web-scraping routines using BeautifulSoup for pagination and structured extraction.
- Used Kali Linux and analyzed publicly available password-breach datasets in educational and experimental work on owned systems or with consent.

Certifications

Oracle APEX Cloud Developer Certified Professional - Oracle University, October 2023.

Certified Pharmacy Technician (CPhT) - Pharmacy Technician Certification Board, January 29, 2016; certification expired January 31, 2018.

Professional Development

Teaching AI Fluency: Anthropic / Claude Academy, October 21, 2026; course-completion badge.

Reference: https://academy.claude.com/verify/3d93d7b8f612a742d0ad2e2450e33a02

Building effective human-agent teams (beta): Anthropic / Claude Academy, October 21, 2026; course-completion badge.

Reference: https://academy.claude.com/verify/e30ebdbda3c9e0cd0cd15b8e200c7c86

Claude Code in action: Anthropic / Claude Academy, October 21, 2026; course-completion badge.

Reference: https://academy.claude.com/verify/586e2a8c4f42f2389b7ca8c6f5c8b943

AI Fluency: Framework and foundations: Anthropic / Claude Academy, October 20, 2026; course-completion badge.

Reference: https://academy.claude.com/verify/d527a933f14aca18ba28352852f785f5

AI Fluency for small businesses: Anthropic / Claude Academy, October 20, 2026; course-completion badge.

Reference: https://academy.claude.com/verify/2d2bd6700f3a1c06f8532c0a8c8ed1c6

AI Fluency for builders: Anthropic / Claude Academy, October 20, 2026; course-completion badge.

Reference: https://academy.claude.com/verify/02c07a1d8383bda387818f8f8bf203bb

AI for Brainstorming and Planning: Google / Coursera, October 19, 2026; course-completion certificate.

Reference: https://coursera.org/verify/2YLBMF1PLHLZ

AI Fundamentals: Google / Coursera, October 19, 2026; course-completion certificate.

Reference: https://coursera.org/verify/ZRSQCP8DOFIQ

Ethical AI: AI essentials for everyone: University of Cambridge / Coursera, October 19, 2026; course-completion certificate.

Reference: https://coursera.org/verify/1Z45SEEVYM5H

Generative AI Software Engineering: Vanderbilt University / Coursera, October 19, 2026; four-course specialization.

Reference: https://coursera.org/verify/specialization/1M592037472S

OpenAI GPTs: Creating Your Own Custom AI Assistants: Vanderbilt University / Coursera, October 19, 2026; course completion; component of Generative AI Software Engineering.

Reference: https://coursera.org/verify/DMMF4BZ4CQIX

AI capabilities and limitations: Anthropic / Claude Academy, October 19, 2026; course-completion badge.

Reference: https://academy.claude.com/verify/4d4e55ba9a065236686dfda7df7ae214

Claude Code 101: Anthropic / Claude Academy, October 19, 2026; course-completion badge.

Reference: https://academy.claude.com/verify/2b667d4d5e5edb3601a7cb392058bcea

Claude 101: Anthropic / Claude Academy, October 19, 2026; course-completion badge.

Reference: https://academy.claude.com/verify/b3445350ec49d475b81f3023c4f12cad

Introduction to Microsoft Azure Cloud Services: Microsoft / Coursera, October 16, 2026; course-completion certificate.

Reference: https://coursera.org/verify/FFOGQQP3PSXM

Prompt Engineering for ChatGPT: Vanderbilt University / Coursera, October 8, 2026. Component of Generative AI Software Engineering.

Reference: https://coursera.org/verify/CL81JTJ5ROWS

AI Agents and Agentic AI with Python & Generative AI: Vanderbilt University / Coursera, September 25, 2026. Component of Generative AI Software Engineering.

Reference: https://coursera.org/verify/OGOWX5XMA3I1

Claude Code: Software Engineering with Generative AI Agents: Vanderbilt University / Coursera, September 25, 2026. Component of Generative AI Software Engineering.

Reference: https://coursera.org/verify/SQLE8YGNLRGE

Data Analysis with Python: IBM / Coursera, September 24, 2026.

Reference: https://coursera.org/verify/NS13F4HMW6BY

Building Generative AI-Powered Applications with Python: IBM / Coursera, September 21, 2026.

Reference: https://coursera.org/verify/NBRV27PXRASZ

Related badge (September 22, 2026; same course completion): https://www.credly.com/badges/e28bfe92-21ea-430f-bb55-7ee066e9f52b

Developing AI Applications with Python and Flask: IBM / Coursera, September 19, 2026.

Reference: https://coursera.org/verify/NYRTWQY0GUUW

Python for Data Science, AI & Development: IBM / Coursera, September 19, 2026.

Reference: https://coursera.org/verify/JWGWUZOBQCZJ

AI Foundations for Everyone (four-course specialization): IBM / Coursera, September 19, 2026.

Reference: https://coursera.org/verify/specialization/ZAXZ6DJWW01U

Generative AI: Prompt Engineering Basics: IBM / Coursera, September 19, 2026. Component of AI Foundations for Everyone.

Reference: https://coursera.org/verify/44HWWVESVWVL

Building AI Powered Chatbots Without Programming: IBM / Coursera, September 19, 2026. Component of AI Foundations for Everyone.

Reference: https://coursera.org/verify/NF9SM2QYXAPA

Generative AI: Introduction and Applications: IBM / Coursera, September 18, 2026. Component of AI Foundations for Everyone.

Reference: https://coursera.org/verify/VWVFL0UA4LQ9

Introduction to Artificial Intelligence (AI): IBM / Coursera, September 17, 2026. Component of AI Foundations for Everyone.

Reference: https://coursera.org/verify/903AS3WT49HV

The Complete PL/SQL Bootcamp: Beginner to Advanced PL/SQL: Udemy, August 25, 2022; course-completion certificate (26 hours).

Reference: https://www.udemy.com/certificate/UC-9cf5e3ac-30e8-4273-8c6b-57016b88c5e2/

Complete Python Course: Go from zero to hero in Python: Udemy, August 25, 2022; course-completion certificate (10.5 hours).

Reference: https://www.udemy.com/certificate/UC-347ed17f-e5f5-4d7b-becc-722d5a61d909/

Introduction to Programming with MATLAB: Vanderbilt University / Coursera, June 11, 2020.

Reference: https://coursera.org/verify/PSE9FDG3MEVU

MATLAB 2018 Essential Training: LinkedIn Learning, June 10, 2020; course completion (3 hours 15 minutes).

MATLAB Fundamentals: Northrop Grumman / Skillsoft, June 2020; course completion.

NASA SATERN management course completions: Facing Challenges as a First-time Manager; The Reality of Being a First-time Manager (both June 28, 2019).

Basic Statistics for Six Sigma: NASA SATERN, June 28, 2019; course completion, not a Six Sigma belt certification.

NASA SATERN data-science course completions: Linear Regression Models: Building Simple Regression Models with Scikit Learn and Keras (June 17, 2019); Machine Learning (June 28, 2019); Data Science Statistics: Applied Inferential Statistics (June 28, 2019).

Python for Data Science - Complex Data Engineering in Python: NASA SATERN, June 17, 2019; course completion. Also completed August 10, 2018; counted once.

NASA SATERN Python course completions: Python: Data Science Fundamentals (April 25, 2018); Python: Iteration and Exceptions (June 15, 2018); Python: The Basics (August 8, 2018); Python: Classes and Modules (August 9, 2018); Python for Data Science - Introduction to Python for Data Science (August 10, 2018).

IT Security for Systems Administrators, Intermediate Level: NASA SATERN, June 19, 2018; course completion.

Advanced Computing for Earth Sciences: University of Virginia / NASA, May 30 - June 15, 2018. Selected for a national cohort of 20; intensive instruction in scientific programming, Fortran, Unix, SLURM, MPI/OpenMP, optimization, and visualization.

Leadership Legacy and Advanced Leadership Programs: Maryland Community College Activities Directors' Association / Frederick Community College, 2014-2015; certificate presented May 17, 2015.

SoloLearn Course Completions

Fourteen course completions, 2016-2026:

- October 15, 2026: TypeScript for Beginners: Code in the AI Era; course-completion certificate. Reference: https://www.sololearn.com/certificates/CC-O55I8BFA
- June 2, 2020: Swift 4.
- May 2020: Machine Learning (May 28); Data Science with Python (May 25); C Tutorial (May 23); Ruby Tutorial (May 20).

- March 23, 2017: C++ Tutorial; Python 3 Tutorial.
- November 22, 2016: CSS Fundamentals; HTML Fundamentals; Java Tutorial; JavaScript Tutorial; PHP Tutorial; SQL Fundamentals.

Research Reports and Presentations

Abraham, C., Norman, O., and Shepherd, E. (2020). Studying Anomalous Discrepancies between MODIS and CALIOP Cloud Observations. UMBC High Performance Computing Facility, Technical Report HPCF-2020-12. Research assistant: Jianyu Zheng; faculty mentor: Zhibo Zhang.

Reference: https://cybertraining.umbc.edu/2020-program/#team2

Abraham, C., Norman, O., Shepherd, E., Zhang, Z., and Zheng, J. (March 2020). Studying Anomalous Discrepancies between MODIS and CALIOP Cloud Observations. UMBC CyberTraining group project presentation.

Reference: https://mdsoar.org/items/64b8270b-e2ee-49fb-891c-228e35ac5542

Shepherd, E., Levy, R., Mattoo, S., Shi, Y., Sawyer, V., and Zhang, Z. (December 2019). Assessing the Use of Forecast Meteorological Analyses to Support Aerosol Retrieval in Near Real-Time. AGU Centennial Fall Meeting, San Francisco, CA. Poster.

Zhang, Z., Shepherd, E., Rajapakshe, C., and Wang, C. (November 2019). Understanding the Quantitative Connection Between Cloud Opacity and Cloud Optical Thickness Using CALIOP and MODIS Observations. MODIS/VIIRS Science Team Meeting, College Park, MD. Poster.

Shepherd, E., and Levy, R. (August 1, 2019). Streamlining Ground-Truth Validation and Algorithm Improvement for the Dark Target Aerosol Research Product. NASA Goddard summer intern poster session, Greenbelt, MD. Poster.

Reference: https://doi.org/10.13140/RG.2.2.25478.11846/1

Shepherd, E., and Yu, H. (August 2018). Study of Aerosol Poleward Transport using CATS Observations. NASA Goddard summer intern poster session, Greenbelt, MD. Poster.

Berman, M., and Shepherd, E. (April 11, 2015). On the Viability of Fresnel Lens Solar Thermal Energy Systems. Northeast Regional Honors Council, Gettysburg, PA. Presentation.

Berman, M., and Shepherd, E. (2014). On the Viability of Fresnel Lens Solar Thermal Energy Systems. Maryland Collegiate STEM Conference, Germantown, MD; also presented at the Frederick Community College fall Honors Forum. Presentations.

Scheduled Presentation at a Canceled Conference

Zhang, Z., Shepherd, E., and Wang, C. (2020). Investigation of Anomalous Transparent Clouds Based on MODIS and CALIPSO Observations. Scheduled for the International Radiation Symposium, Thessaloniki, Greece. Conference canceled due to COVID-19; not presented at that event.

NASA Invention Disclosures

Shepherd, E., Levy, R., and Shi, Y. Python AERONET Data Retrieval Tool. Submitted July 8, 2019. Co-inventor on a NASA New Technology Report for a cross-platform data downloader usable as a Python module and command-line utility.

Shepherd, E., Levy, R., and Mattoo, S. Python CONGRID Module. Submitted July 8, 2019. Co-inventor on a NASA New Technology Report for multidimensional interpolation with geospatial support and removal of an IDL dependency.

Acknowledgments and Contributions

Acknowledged for coding assistance in Dacic, N., et al. (2020). Evaluation of NASA's high-resolution global composition simulations: Understanding a pollution event in the Chesapeake Bay during the summer 2017 OWLETS campaign. Atmospheric Environment, 222, 117133.

Reference: https://doi.org/10.1016/j.atmosenv.2019.117133

Named contributor to John Rodriguez's Enhancing Red Teaming with AI and ML, SANS HackFest Summit, November 2023. Contributed an unreleased AI red-teaming experiment examining failure of model safeguards under model-driven prompting.

Reference: https://www.sans.org/presentations/enhancing-red-teaming-with-ai-and-ml

Selected Professional Engagements

- Selected for and attended the Maryland Space Business Roundtable luncheon for NASA interns, July 16, 2019; opportunity limited to 20 interns.
- Selected for and attended the Goddard Retirees and Alumni Association luncheon, July 9, 2019; opportunity for 20 Goddard college interns and their mentors.
- Participated in a discussion with UMBC President Hrabowski and Maryland Budget and Management Secretary David Brinkley about student experiences, internships, and workforce partnerships, October 4, 2018.

Conference Travel Support

University of Virginia, 2019 AGU Fall Meeting: approved funding for conference registration and airfare.

Volunteer Activities

Volunteer activity: Volunteer Advisory Member, FCC MakerSpace Cadre with Frederick Community College (Frederick, MD; 2017).

- Advised on equipment selection and launch planning for the college's makerspace, drawing on experience co-founding and operating Industrial Commons.
- Named on FCC's Makerspace Cadre appreciation plaque for volunteer contributions to establishing the makerspace.

Volunteer activity: Honors College Intern (Unpaid) with Frederick Community College (Frederick, MD; February 2015 - May 2015).

- Created flyers, posters, and graphics for the Honors College in Dr. Bruce Thompson's office.
- Prepared correspondence to students.
- Led a resume-writing workshop in collaboration with the Honors Student Association.

Volunteer activity: Co-director, Charity Talent Show with Frederick Community College, Honors Student Association (Frederick, MD; April 2015; event held April 16, 2015).

- Coordinated performer registration, answered inquiries, and reviewed recorded audition submissions with the co-director.
- Helped plan and run the Honors Student Association fundraiser benefiting the Adult Congenital Heart Association.
- Managed the stage on event day, coordinating performers, act order, and transitions between performances.

Volunteer activity: Volunteer, Habitat for Humanity Service Trip with Habitat for Humanity (Wilmington, NC; March 29 - April 3, 2015).

- Participated in the service trip organized through Frederick Community College.

Volunteer activity: Honors College Representative and Volunteer Moderator, President's Business Summit with Frederick Community College (Frederick, MD; January 22, 2015).

- Represented the Honors College as a student volunteer and moderated a table discussion with business-community participants.

Volunteer activity: Organizer, Hygiene Supply Drive for Frederick Rescue Mission with Frederick Community College (Frederick, MD; November 27 - December 18, 2014).

- Organized a campus hygiene-supply drive, placed collection boxes around FCC, and gathered and prepared donated items for donation to Frederick Rescue Mission.

Volunteer activity: Volunteer, Willowdale Park Waterway Cleanup with Frederick Community College, Honors Student Association (Frederick, MD; September 27, 2014).

- Participated in the waterway cleanup co-sponsored by the FCC and Hood College Honors Programs.

Volunteer activity: Stagehand, Charity Talent Show with Frederick Community College (Frederick, MD; April 2013 and April 2014).

- Assisted with stage and equipment setup, moved props between acts, and supported performers backstage.

Volunteer activity: Participant, Hike for Hope with Frederick Community College, Honors Student Association (Appalachian Trail, Maryland; October 26, 2012).

- Participated in the charity hike benefiting Hope Alive.

Student Organizations

Student leadership: Public Relations Officer with Tau Sigma National Honor Society, Alpha Psi Chapter, University of Maryland, Baltimore County (Baltimore, MD; 2016 - 2017).

- Supported member recruitment through campus advertising and promotional materials, coordinating with Commonvision.
- Maintained Facebook and myUMBC groups, published event announcements and reminders, and managed membership and administrator access.
- Prepared event calendars and chapter communications; organized and shared photographs from meetings, events, and service projects.

Student leadership: Secretary of Health and Mental Hygiene with Maryland Student Legislature (Maryland; September 2014 - May 2015).

- Reviewed proposed health and mental-hygiene legislation and helped members develop and refine bills for student legislative sessions.

Student leadership: FCC Delegation Secretary with Maryland Student Legislature, Frederick Community College delegation (Frederick, MD; May 2014 - May 2015).

- Coordinated submission of delegation bills for the Annual Session.
- Submitted event registrations and handled correspondence about delegation dues and invoices.
- Staffed the delegation's table at campus events to recruit members and helped coordinate delegation elections.

Student leadership: Vice President with STEM Club, Frederick Community College (Frederick, MD; May 2014 - May 2015).

- Co-led weekly club meetings with the president and organized a semester group engineering project.
- Planned club events and supported outreach and member recruitment.

Awards and Honors

- Professional Edge digital badge, UMBC / University System of Maryland, March 26, 2020; awarded following completion of the Intern Success Practicum, a positive supervisor evaluation, and review of an internship-experience video.
- Student Service Award, Center for Student Engagement, Frederick Community College, 2015.
- Martin Kalmar Award for Academic Excellence in Mathematics, Frederick Community College, May 17, 2015.
- Honors College Gold Medal (High Honors), Frederick Community College, May 17, 2015.
- Who's Who Among Students in American Colleges & Universities, 2015.
- AMATYC Student Mathematics League, Certificate of Merit in the National Mathematics Competition, 2013-2014 and 2014-2015.
- Academic lists: UMBC President's List and Dean's List, spring 2017; UMBC Semester Academic Honors, spring 2016; Frederick Community College Dean's List, fall 2012, spring 2013, fall 2014, and spring 2015.
- Honor-society inductions: Sigma Pi Sigma (lifetime membership), May 7, 2021; Golden Key, November 9, 2016; National Society of Collegiate Scholars, October 2, 2016; Tau Sigma, May 6, 2016; Sigma Alpha Lambda, April 5, 2016; Phi Theta Kappa, May 10, 2013.
- Recognized among FCC's top five scorers on the Student Mathematics League test, March 2015 (college-level recognition).

Selected Professional Membership

American Geophysical Union: student member, July 31, 2019 - December 31, 2020.