Christopher D. Smith
Geology (B.S.), Indiana University Northwest - Expected Spring 2027
Research Focus: Coastal geomorphology and landscape evolution, sediment dynamics, coastal wetland ecogeomorphology, and GIS-based reconstruction of historical landscape change.
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Education

Bachelor of Science in Geology **GPA: 3.97**
Indiana University – Northwest – Expected Spring 2027
Chancellor's List, Spring 2026
Certificate in Geographic Information Science
Indiana University – Northwest – Expected Spring 2027
Associate of Science in Chemistry (Ivy Honors Program) **GPA: 3.84**
Ivy Tech Community College – Lake County — 2021
Dean's List (multiple semesters), *Magna Cum Laude*
Associate of Science in Biology (Ivy Honors Program) **GPA: 3.84**
Ivy Tech Community College – Valparaiso — 2020
Dean's List (multiple semesters), *Magna Cum Laude*
Associate of Science, Liberal Arts (Ivy Honors Program) **GPA: 3.84**
Ivy Tech Community College – Valparaiso — 2020
Dean's List (multiple semesters), *Magna Cum Laude*
Bachelor of Science in Business Administration
Concentration in Environmental Sustainability
University of Phoenix – Honolulu — 2014

Selected Coursework

Geology & Earth Systems: Structural Geology, Sedimentology & Stratigraphy, Field Methods in Geology, History of the Earth, Petrology, Climate Change Science, Oceanography, Mineralogy (Fall 2026)
GIS & Quantitative Methods: Advanced GIS, Environmental GIS (Spring 2027), Python for GIS (Fall 2026), Calculus I–II, Statistics, Calculus-Based Physics I (Mechanics), Physics II (Heat, Electricity, and Optics)
Supporting Sciences: Organic Chemistry I–II, Analytical Chemistry (Quantitative Chemical Analysis), Genetics, Molecular Biology, Microbiology

Research Experience

GIS Landscape Change Analysis — I-80/94 Corridor (Frank Borman Expressway)
Indiana University Northwest | 2025–present

Georeferencing historic aerial imagery (1938–1967) and integrating 2023 mosaics in ArcGIS Pro to reconstruct landscape change and evaluate infrastructure-driven geomorphic change, floodplain modification, and residential displacement across the Calumet region using multi-temporal spatial analysis and deep-learning building detection.

Research Intern
Lake Michigan Ecological Research Station, Great Lakes Science Center
U.S. Geological Survey — Indiana Dunes National Park, Indiana
Summer 2025

- Conducted demographic census monitoring of federally threatened dune thistle (*Cirsium pitcheri*) across Lake Michigan coastal dune systems
- Surveyed permanent marker-based transects using quadrat sampling protocols supporting long-term recovery datasets
- Recorded life-stage transitions (seedling → flowering adult) for regional metapopulation monitoring
- Evaluated environmental stressors, including erosion, invasive species encroachment, and seed predation
- Collected floral tissue and seed-head samples supporting genetic diversity assessment workflows
- Identified native dune flora and monitored invasive seed-predation insects (*Larinus* spp.) affecting reproductive success of *Cirsium pitcheri* populations.
- Participated in native pollinator monitoring through the Bumble Bee Rapid Monitoring Network (BRMN)
- Performed standardized database entry, validation, and QA/QC for threatened-species recovery datasets

Research Trainee
Summer 2021
Great Lakes Innovative Stewardship Through Education Network (GLISTEN)
Indiana University Northwest / Valparaiso University Collaborative Program

Meadowbrook Forestry Project — Shirley Heinze Land Trust

- Established permanent vegetation inventory plots supporting long-term forest monitoring
- Conducted tree and understory vegetation surveys assessing species composition and diversity
- Compared historical aerial imagery with 2021 vegetation inventories to evaluate landscape change
- Produced GIS datasets documenting monitoring plot locations for future conservation assessment
- Delivered technical PowerPoint presentation summarizing vegetation inventory and aerial-photo analysis to conservation scientists and partner land-management staff

Gary Green Link Corridor Site Assessments — The Nature Conservancy

- Conducted vegetation surveys evaluating canopy structure, understory composition, and land-cover condition across brownfield restoration parcels
- Completed conservation site assessments supporting corridor revitalization planning
- Used GIS to establish parcel ownership boundaries and spatial relationships across restoration target areas
- Supported ecological baseline documentation for long-term landscape connectivity planning
- Delivered technical PowerPoint presentation summarizing vegetation and GIS assessment findings to conservation scientists and restoration practitioners

Astrobiology Research Assistant
Valparaiso University — Department of Chemistry
Indiana Space Grant Consortium | 2019

- Designed and executed experimental protocols investigating the stability of aromatic amino acids (tyrosine, tryptophan, phenylalanine) in Mars regolith simulant containing perchlorate salts
- Prepared all experimental solutions, regolith simulant mixtures, and concentration calculations for controlled degradation studies
- Calibrated and operated ultra-high-performance liquid chromatography–mass spectrometry (UHPLC–MS) instrumentation and managed autosampler sequences
- Collected chromatographic datasets and integrated peaks to quantify amino acid persistence following environmental exposure
- Interpreted mass spectra to confirm compound identity and assess oxidative degradation pathways relevant to biosignature preservation
- Produced and presented research poster: *The Stability of Amino Acids within Mars Regolith Simulant*

Computational Catalysis Research Assistant
Valparaiso University — Department of Physics & Astronomy
Indiana Space Grant Consortium | Fall 2018 – Spring 2019

- Modeled propane dehydrogenation reaction pathways on graphene-supported Ni_4 catalysts using VASP
- Applied density functional theory (PBE functional; PAW pseudopotentials) to evaluate binding energies and activation barriers
- Calculated minimum-energy reaction paths using climbing-image nudged elastic band (CI-NEB) methods
- Executed simulations in a Linux-based high-performance computing environment using multi-core and multi-node parallel processing
- Managed distributed simulation workflows across multiple processors and compute nodes
- Visualized and interpreted catalyst–surface interaction structures using Chemcraft

Field & Restoration Experience

Biological Technician Intern (AmeriCorps State & National / SCA)
U.S. Fish and Wildlife Service — Aransas National Wildlife Refuge
Sept 2015 – Sept 2016

- Reclaimed ~3,400 acres of refuge land supporting landscape-scale habitat management objectives
- Restored and developed six wetland units totaling ~1,300 acres through hydrologic infrastructure installation and modification
- Maintained levee gating systems and pump-supported water-control structures for wetland restoration and freshwater retention
- Supported salinity management operations across coastal marsh units to improve habitat suitability for migratory bird and alligator populations
- Implemented restoration treatments aligned with NRCS wetland conservation practice standards
- Assisted prescribed-burn unit preparation supporting coastal prairie and marsh habitat management
- Supported native vegetation establishment across restored wetland and upland units

- Supported *Falco femoralis* (Aplomado Falcon) banding operations in collaboration with The Peregrine Fund recovery program
- Developed GIS maps and maintained ecological and infrastructure datasets supporting refuge management planning
- Coordinated personnel, equipment allocation, and restoration logistics as SCA field team leader
- Operated heavy restoration equipment, including Marsh Master XL, D6 bulldozer, John Deere 8R tractor, skid steer, and FECON vegetation management systems
- Supported staging and transport of heavy equipment for refuge-scale restoration implementation

Biological Technician Intern (AmeriCorps State & National / SCA)
U.S. Fish and Wildlife Service — Marais des Cygnes National Wildlife Refuge
Mar 2015 – Sept 2015

- Restored 548 acres of wetland habitat to improve hydrologic function and ecological resilience
- Restored and cataloged 104 acres of bottomland hardwood forest supporting floodplain habitat recovery
- Reestablished a 60-acre tallgrass prairie system through seed broadcasting and native vegetation establishment
- Implemented invasive species removal treatments using boom sprayers and backpack sprayers across restoration units
- Supported prescribed-burn unit preparation for prairie management and habitat maintenance
- Established monitoring plots and transects supporting restoration assessment and vegetation response tracking
- Planted native hardwood trees and milkweed species supporting pollinator habitat and ecosystem recovery
- Monitored populations of threatened Mead's milkweed (*Asclepias meadii*) within refuge management areas
- Operated agricultural restoration equipment, including tractors and spray systems, supporting habitat treatments

Wetland Biology Technician Intern (AmeriCorps State & National / SCA)
National Park Service — Manassas National Battlefield Park
Sept 2016 – Mar 2017

- Restored wetland habitat functions following NRCS Wetland Conservation Practice Standards to approximate pre-disturbance hydrological conditions
- Established native wetland and pollinator grassland habitats supporting biodiversity and landscape connectivity
- Supported watershed-scale environmental education through the NOAA Bay Watershed Education and Training (B-WET) program
- Developed ecological interpretation maps and a mobile application supporting resource management and visitor engagement
- Designed standards-aligned instructional materials on coastal wetland and estuary ecology for watershed literacy initiatives
- Assisted development of interpretive materials linking hydrology, habitat restoration, and land-use history across the park landscape

Laboratory Experience

Lead Physical & Life Science Laboratory Technician
Ivy Tech Community College — Valparaiso Campus
2018–Present

- Prepared and supported instructional laboratories across biology, chemistry, physics, earth science, and alternative energy curricula
- Standardized preparation of organic and inorganic chemical solutions and maintained bacterial and fungal cultures using sterile technique
- Operated, calibrated, and maintained laboratory instrumentation, including compound, dissecting, and fluorescence microscopes, spectrophotometers, analytical balances, pH meters, incubators, autoclaves, and chemical fume hoods
- Supported molecular laboratory workflows, including PCR preparation, buffer preparation, and gel electrophoresis procedures
- Prepared buffers and electrophoresis gels and calibrated instrumentation to ensure experimental reliability and instructional readiness
- Trained students and teaching assistants in laboratory instrumentation, experimental procedures, and safety compliance
- Managed laboratory inventories and chemical storage systems in accordance with institutional safety protocols
- Coordinated hazardous materials handling and laboratory safety documentation with faculty and department leadership
- Provided interdisciplinary laboratory coordination supporting faculty instruction and student experimental training across multiple scientific disciplines

Research Presentations

Smith, C. D.
Assessing the Environmental Impact of the Borman Expressway in the Calumet Region
Poster presentation, Indiana University Northwest Student Research Conference, Indiana University Northwest, 2026

Smith, C., Kovarik, C., Davidson, K., Rowe, L.
The Stability of Amino Acids within Mars Regolith Simulant
Poster presentation, Symposium on Undergraduate Research and Creative Expression (SOURCE), Valparaiso University, 2019
https://scholar.valpo.edu/cus/829/

Smith, C., Kovarik, C., Davidson, K., Rowe, L.
The Stability of Amino Acids within Mars Regolith Simulant
Invited poster presentation, Indiana University Northwest, 2019

Kovarik, C., **Smith, C.**, Davidson, K., Rowe, L.
The Stability of Unnatural Amino Acids within Mars Planetary Conditions
Poster presentation, Symposium on Undergraduate Research and Creative Expression (SOURCE), Valparaiso University, 2019
https://scholar.valpo.edu/cus/823/

Duensing, J., Allred, J., **Smith, C.**, Zygmunt, S.
Sub-Nanometer Catalyst Clusters for Propane Dehydrogenation
Poster presentation, SOURCE Symposium, Valparaiso University, 2019
https://scholar.valpo.edu/cus/782/

Allred, J., **Smith, C.**, Zygmunt, S.
Altering the Activity of a Ni_4 Catalyst for Propane Dehydrogenation Using a Nitrogen-Doped Graphene Support
Poster presentation, SIRES Symposium, Valparaiso University, 2018
https://scholar.valpo.edu/sires/40/

Technical Skills

GIS & Spatial Analysis: ArcGIS Pro, ArcGIS Online
Computational & Analytical Tools: VASP (DFT modeling software), Chemcraft molecular visualization, Linux high-performance computing (HPC) environments
Laboratory Instrumentation & Techniques: UHPLC–MS, PCR preparation, gel electrophoresis, sterile culture technique
Restoration & Field Equipment: Marsh Master XL, D6 bulldozer, John Deere 8R tractor, skid steer, FECON vegetation management systems

Certifications & Licenses

FCC Amateur Radio License, General Class (Callsign: KE9GCQ)
FAA Part 107 Remote Pilot Certificate (In Progress)

Research Methods

Historical aerial-photo georeferencing · GIS feature extraction · temporal landscape reconstruction · vegetation plot and quadrat sampling · threatened-species demographic monitoring · restoration-scale hydrologic and geomorphic interpretation · chromatographic analysis · density functional theory (DFT) modeling · reaction-path analysis (CI-NEB)

Professional Affiliations

Sigma Gamma Epsilon Earth Science Honor Society, Inducted 2026
Geological Society of America Member
Association of Environmental & Engineering Geologists Member

Professional Service & Networks

AmeriCorps Alums
Student Conservation Association Alums

Honors & Awards

Phi Theta Kappa Honor Society, Inducted 2018
Chapter President (2018–2020)
All - Indiana Academic Team (2019)
Lakshmi Raman Award (2019)
Sue Jackson Award (2020)
Recipient, PTK Hallmark Awards - Power of Progress; Outstanding Officer Team; International Honors in Action; International 5-Star Award; Indiana Region Flag Bearer for the 102nd International Convention (2020)
Calumet Gem & Mineral Society Scholarship (2025-2026)
Outstanding Geology Senior, Indiana University Northwest College of Arts & Sciences (2026)
Urban League of Northwest Indiana Scholarship (2026)