Colin Elkin

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Summary

Seasoned academic, turned industry data scientist, turned academic again. I am highly passionate about educating, enlightening, inspiring, and mentoring diverse groups of students across a variety of backgrounds using inclusive, evidence-based teaching practices.

Education

2018 PhD, Engineering (Computer Science and Engineering)
The University of Toledo, Toledo, OH

2015 MS, Engineering (Computer Science and Engineering)
The University of Toledo, Toledo, OH

2013 BS, Electrical Engineering
The University of Tulsa, Tulsa, OK

Academic and Professional Experience

2024- Assistant Teaching Professor
Roosevelt University, Chicago, IL

2022-2023 Senior Data Scientist
Xylem, Inc., Morton Grove, IL

2019-2022 Assistant Professor
Purdue University Northwest, Hammond/Westville, IN

2018-2019 Visiting Assistant Professor
Purdue University Northwest, Hammond/Westville, IN

2018 Visiting Instructor
Purdue University Northwest, Hammond/Westville, IN

2014-2018 Graduate Research Assistant
The University of Toledo, Toledo, OH

2014-2016 Graduate Teaching Assistant
The University of Toledo, Toledo, OH

Teaching Experience

All evaluations are out of 5.0.

Roosevelt University

Term	Course Number and Title	Teaching Evaluation
Fall 2025	CST 336/436: Computing with Data in Python	TBD
	CST 348: Software Engineering I	TBD
	CST 357/457: Systems Programming	TBD
Summer 2025	CST 280: Introduction to Algorithms	TBD
	CST 357/457: Systems Programming	TBD
Spring 2025	CSIA/CST 261: Computer Organization (and Assembler)	4.1
	CST 280: Introduction to Algorithms	4.5[2]
	CST 378: Software Engineering II	4.4
	CSIA/CST 399: Senior Project	4.4
Fall 2024	CSIA/CST 150: Computer Science I	N/A[1]
	CST 411: Intelligent Systems	4.5
	CST 487: Advanced Software Engineering	4.3

Purdue University Northwest

Term	Course Number and Title	Teaching Evaluation
Spring 2022	ENGR 19000: Elementary Engineering Design	N/A[3]
	ECE 20200: Linear Circuit Analysis II	4.5[3]
	ECE 27001: Introduction to Digital System Design	4.5[3]
	ECE 49500/59500: Machine Learning	N/A[3]
Fall 2021	ECE 36201: Microprocessor System Design and Interfacing	5.0
	ECE 44800: Introduction to Communication Theory	4.8
	ECE 49500/59500: Neural Networks: From Theory to Practice	4.9[2]
Summer 2021	ECE 20200: Linear Circuit Analysis II	4.8
Spring 2021	ECE 27001: Introduction to Digital System Design	4.4[2]
	ECE 49500/59500: Machine Learning	4.5[2]
Fall 2020	ENGR 15100: Software Tools for Engineers	4.3[2]
	ENGR 19000: Elementary Engineering Design	4.5
	ECE 49500/59500: Neural Networks: From Theory to Practice	4.6[2]
Summer 2020	ECE 20200: Linear Circuit Analysis II	4.7

Spring 2020	ENGR 19000: Elementary Engineering Design	4.3
	ECE 27001: Introduction to Digital System Design	4.8
Fall 2019	ECE 15200: Programming for Engineers	4.3
	ENGR 19000: Elementary Engineering Design	3.7
	ECE 36201: Microprocessor System Design and Interfacing	4.6
Summer 2019	ECE 20100: Linear Circuit Analysis I	N/A[4]
Spring 2019	ENGR 15100: Software Tools for Engineers	3.3
	ENGR 19000: Elementary Engineering Design	N/A[5]
	ECE 30200: Probabilistic Methods for ECE	4.0
	ECE 43900: Senior Engineering Design II	4.3
Fall 2018	ECE 15200: Programming for Engineers	3.7
	ECE 36201: Microprocessor System Design and Interfacing	4.3
	ECE 44000: Transmission of Information	4.2

Course Development

Roosevelt University

CSIA/CST 150: Computer Science I

Fall 2024

- Conducted course in laboratory-based flipped-classroom format in which students were given reading assignments outside of class and would answer open-ended questions based on their understanding of the reading. From there, class periods consisted of short mini-lectures answering their questions and clarifying concepts they found interesting and/or difficult, with the rest of the class period used to work on programming assignments.
- Created most of the programming assignments, all end-of-chapter quizzes, and a final project.

CSIA/CST 261: Computer Organization (and Assembler)

Spring 2025

- Rearranged order of course coverage to allow gradual buildup of difficulty level from basic base conversion and binary arithmetic to digital logic and Assembly language programming while moving the less mathematical and less algorithmic computer architecture material to the last unit.
- Added new example problems, in-class problems, and end-of-unit quizzes.
- Added new hands-on assignments including programming of a field-programmable gate array (FPGA) for practical demonstration of digital logic and programming of a STM32-based microcontroller to demonstrate use of Assembly language in embedded systems.
- Added advanced topic presentation as a final assignment to allow students a chance to relate a relevant topic to an application of their interest and present the topic in a peer-reviewed asynchronous format.

[1]The minimum threshold of completed evaluations needed to see results was not met.
[2]Weighted average of multiple combined sections.
[3]Course evaluations for this semester were released on my last day at PNW, and I was unable to download the evaluation reports before my computer account was deactivated. Evaluation scores from this semester that are reported are from memory.
[4]Evaluations were not conducted during this summer semester.
[5]This course had two instructors, and only one instructor received evaluations.

CST 280: Introduction to Algorithms

Summer 2025 (ongoing)

- Will create online quizzes in the format of a technical interview, in order to help ensure quiz integrity as well as provide a practical format to give students experience in a typical job interview format.

Spring 2025

- Created new lecture materials, including additional sorting algorithms and introduction to machine learning algorithms, along with new example problems and in-class problems based on relatable applications (e.g., guessing a number in first lecture, sorting playing cards).

CST 336/436: Computing with Data in Python

Fall 2025 (ongoing)

- Will be substantially revising this course for a greater focus on applied machine learning (which will tentatively become the new course title in future semesters) for better alignment with the upcoming MS in Data Science and MS in Artificial Intelligence programs, including new lecture materials, programming assignments, quizzes, and a final project.
- Will conduct the course in a flipped classroom format, in which students will watch most lectures outside of class and use the class time for answering questions about lecture material, conducting group-based active learning activities for reinforcing understanding of lecture material, and working on programming assignments in a lab-based format.

CST 348: Software Engineering I

Fall 2025 (ongoing)

- Will conduct class in a mostly flipped classroom format, in which students will watch most lectures (from Unit 2 onward) outside of class and use the class time for answering questions about lecture material, conducting group-based active learning activities for reinforcing understanding of lecture material, and working on group-based software design assignments as well as simulating Agile/Scrum meetings (e.g., daily standups) for said assignments.

CST 357/457: Systems Programming

Fall 2025 (ongoing)

- Will convert the course to a flipped classroom format, in which students will watch most lectures (from Unit 2 onward) outside of class and use the class time for answering questions about lecture material, conducting group-based active learning activities for reinforcing understanding of lecture material, and working on programming assignments in a lab-based format.
- Will create additional programming assignments to accommodate the flipped-classroom format, with each assignment requiring an instructor check-off portion to help ensure transparent, ethical, and accurate use of generative AI in the assignments.
- Will develop new written quizzes to help reinforce student understanding of technical portions of material (e.g., C programming, UNIX commands) without the aid of generative AI.

Summer 2025 (ongoing)

- Creating new lecture materials and online quizzes.

CSIA 399/CST 378/CST 399: Software Engineering II/Senior Project

Spring 2025

- Included the use of GitHub Projects/Issues (as an Atlassian Jira alternative) for modern Agile/Scrum project management to help delegate project tasks among teammates and track progress while using wiki tools in GitHub for collaborative project documentation (as an Atlassian Confluence alternative).
- Used a flipped classroom format for most lecture units in order to allocate more class time to simulate Agile/Scrum meetings (e.g., daily standups, sprint reviews, sprint retrospectives).

CST 411: Intelligent Systems

Fall 2024

- Created a midterm project for students to implement several search algorithms in Python on a variety of real-world datasets and report their results as well as a final project for students to research an advanced planning topic, present it to the class, and write a final report.
- Created new lecture materials along with example problems relating search algorithms to real-world applications (e.g., GPS navigation, robotic vaccum path).

CST 487: Advanced Software Engineering

Fall 2024

- Incorporated Agile/Scrum software methodologies to existing software design assignments (e.g., Atlassian Confluence for collaborative documentation, Atlassian Jira for dividing team-based assignments among group members).

Purdue University Northwest

ECE 15200: Programming for Engineers

Fall 2018

- Due to small class size, conducted class in a combined lecture/lab format, using both dedicated lecture times and dedicated lab times to alternate between short mini-lectures and in-class programming assignments to enhance active learning.
- Added final project based on creating a tic-tac-toe game as a hands-on way to demonstrate object-oriented programming.

ENGR 19000: Elementary Engineering Design

Spring 2022

- Created new lecture materials to accommodate the completely redeveloped lab portion of the course that occurred in Summer 2020 under Dr. Constantin Apostoaia.

Spring 2020

- Quickly converted all lab assignments to online format (ECE half of course started in March 2020, just one week before all classes had to immediately move to online instruction!).
- Converted in-class problems from previous semester into asynchronous quizzes in order to adjust the lecture portion of the course to the new online format.

Fall 2019

- Created in-class problems for circuit analysis, base conversion, and binary arithmetic to add a more interactive component to the lecture portion of the course.
- Created two quizzes (one based on circuit analysis and one based on digital logic) to help reinforce understanding of introductory material.
- Created new lab assignment that introduced simple MATLAB programming in relation to circuit analysis.

ECE 20100: Linear Circuit Analysis I

Summer 2019

- Created new lecture slides and implemented group-based in-class problems to help with student practice at the beginning of the semester.
- Created three new end-of-unit exams.

ECE 20200: Linear Circuit Analysis II

Spring 2022

- Complemented lecture material with links to existing YouTube videos with the intent of helping with visual understanding of concepts such as AC versus DC voltage, transformers, and three-phase power while better relating them to real-world applications.
- Converted online end-of-unit exams to written exams to accommodate return to in-person instruction.

Summer 2021

- Added new lecture material to review additional ECE 20100 concepts to help bridge the gap between the two courses.

Summer 2020

- Created new lecture notes and example problems as well as three online end-of-unit exams.

ECE 20700: Electronic Measurement Techniques

Summer 2020

- Revised entire lab manual to accommodate online and hybrid-online lab formats by allowing the Digilent Analog Discovery 2 kit as an alternative to traditional in-lab electrical equipment and providing instructions for both sets of tools.

ECE 27001: Introduction to Digital System Design

Spring 2022

- Modified two introductory labs created in previous year to involve physical creation of digital circuits on breadboards due to return to in-person lab format.
- Added new lecture content to cover SystemVerilog programming concepts in greater depth in order to bridge the gap between lecture and lab material (based on students' end-of-semester feedback in previous year) as well as introduce and compare VHDL language.
- Converted seven online quizzes into three larger written exams to accommodate return to in-person instruction.
- Added optional secondary textbook to syllabus as a reference text for SystemVerilog programming.

Spring 2021

- Coordinated lab assignments (initially provided by Prof. Steve Naumov) and equipment to allow more hands-on semi-online laboratory format.
- Created two new introductory labs to show digital logic working in circuit format using NI MultiSim.
- Created new final project to give students more organic way to demonstrate cumulative understanding of course content.
- Converted four written exams into seven online quizzes to provide smoother online lecture format.

Spring 2020

- Changed textbook and created new sets of lecture notes, example problems, in-class problems, and exams for smoother dissemination of material.

ECE 30200: Probabilistic Methods in ECE

Spring 2019

- Created new lecture materials, including the addition of the Naive Bayes algorithm and neural networks as new topics.
- Created two projects for implementing and simulating different probabilistic methods in MATLAB.

ECE 36201: Microprocessor System Design and Interfacing

Fall 2021

- Created new lecture notes, example problems, in-class problems, and exams to accommodate new textbook and microcontroller that were integrated into the course in Fall 2020 under Dr. David Kozel.
- Modified final project to accommodate new microcontroller, along with new project suggestions based on chapters from the new textbook .

Fall 2019

- Added new lecture notes and examples.
- Converted exam format into two written quizzes to test theoretical understanding and two computer-based exams to test understanding of laboratory concepts.
- Created new final project to give students more organic way to demonstrate cumulative understanding of course content.

Fall 2018

- Created new lecture notes, example problems, and exams.

ECE 49500/59500: Machine Learning

Spring 2022

- Created new lecture notes and example problems based on feature selection and moved recurrent neural network material to different course (ECE 49500/59500: Neural Networks).
- Converted six online quizzes into three larger written exams to accommodate return to in-person instruction.
- Modified weekly Python assignments to require more code modification, based on students' end-of-semester feedback in previous year.

Spring 2021

- Created new lecture notes and example problems (some initially provided by Dr. Sidike Paheding) as well as quizzes, weekly Python programming assignments, and three MATLAB-based projects.

ECE 49500/59500: Neural Networks: From Theory to Practice

Fall 2021

- Revised lecture material to include more example problems relevant to ECE topics and added topic of recurrent neural networks.
- Adjusted frequency and size of programming assignments to better suit student pacing, based on students' end-of-semester feedback in the previous year.
- Converted five online quizzes to four written exams to accommodate return to in-person instruction.

Fall 2020

- Developed as new elective course for senior and graduate students: created all lecture materials, example problems, online quizzes, programming assignments, and projects.

Service Activities

Roosevelt University

- Member of faculty dispute resolution committee (2025-present).
- Served on search committee for position of founding director of applied computing (2025).
- Represented department in Major Exploration and Activities Fair (2025).
- Member of ad hoc internship review committee (2024-present).

Purdue University Northwest

- Member of Brightspace local change management committee (2021-2022).
- Member of the Flexible Learning Models committee, which developed ideas for connecting Hammond and Westville campus course sections for better teaching load efficiency (including the "room-to-Zoom" format explained below) (2021).

College of Engineering and Sciences (CES)

- Served on search committee for two tenure-track faculty positions within the Department of Computer Science (2021-2022).
- Organized and held PNW's second annual AI/ML Summer Camp, which taught artificial intelligence and machine learning concepts as well as Python programming to high school students, taught simultaneously in person on campus and online (2021).
- Member of CES council (2020-2022).
- Co-secretary for CES council (2021-2022).

Electrical and Computer Engineering (ECE) Department

- Served as an unofficial program director for the Westville campus EE program by mentoring visiting faculty, hiring and managing UTAs, and monitoring overall EE student satisfaction (2019-2022).
- Expanded on the above role by helping to transition the Westville EE program into a semi-distance learning format. This was done by connecting Westville ECE labs to corresponding Hammond course sections (in rooms with existing distance learning equipment) and training ECE instructors with teaching Westville students in this "room-to-Zoom" format (2021-2022).
- Served on search committee for department lab technician position (2022).
- Served as member of multiple M.S. thesis committees (2020-2021).
- Served as primary advisor to one non-thesis M.S. student (2020-2021).
- Member of ECE graduate committee (2018-2019, 2021-2022).
- Member of ECE undergraduate committee (2019-2021).
- Member of Computer Engineering program committee (2020-2021).
- Served on search committee for visiting faculty position (2019).

External

- Member of Council on Undergraduate Research (CUR) (2025-present)
- Member of Region 4 IEEE professional chapter (2014-present).
- Former reviewer for the following journals:
  - Applied Soft Computing
  - Computers and Electrical Engineering
  - IEEE Access
  - IEEE Sensors
  - Heliyon
  - Microprocessors and Microsystems
  - Signals, Image, and Video Processing
  - Journal of Kind Saud University – Computer and Information Sciences
- Session chair for 17th IEEE International Conference on Machine Learning and Applications (2018).
- Session co-chair for Applied Human Factors and Ergonomics (AHFE) 2017 and 2018 conferences.
- Reviewer for conference:
  - 17th IEEE International Conference on Machine Learning and Applications

Honors and Awards

- Scientific Teaching Fellow for Mobile Institutes on Scientific Teaching (MoSI) (2025)
- Xylem Inc. Gold Spot Award (2022)
- PNW Center for Faculty Excellence, Flexible Learning Development Grant, $1,000 (2021)
- PNW CES Budget Advisory Committee Award, $3,000 (2020)
- PNW Catalyst Award, $20,000 (2019)
- ArcelorMittal Burns Harbor Early Concept Award, $10,000 (2019)
- University of Toledo, EECS Department Dissertation of the Year Award (2019)
- DAGSI Award (Competitive Renewal), $34,829 (2018)
- DAGSI Award (Competitive Renewal), $52,260 (2017)
- University of Toledo Advanced Leadership Academy Award (2017)
- Dayton Area Graduate Studies Institute (DAGSI) Award, $51,351 (2016)
- University of Toledo Advanced Leadership Academy Award (2016)

Publications

Articles in Journals

1. N. Siddique, S. Paheding, **C. Elkin**, and V. Devabhaktuni, "U-net and its variants for medical image segmentation: A review of theory and applications," *IEEE Access* 9, pp. 82031-82057 (2021)
2. U. Khan, S. Paheding, **C. Elkin**, and V. Devabhaktuni, "Trends in deep learning for medical hyperspectral image analysis," *IEEE Access* 9, pp. 79534-79548 (2021)

3. P. Damacharla, P. Dhakal, J. P. Bandreddi, A. Y. Javaid, J. J. Gallimore, **C. Elkin**, and V. Devabhaktuni, "Novel human-in-the-loop (hil) simulation method to study synthetic agents and standardize human–machine teams (hmt)" *Applied Sciences* 10 (23), p. 8390 (2020)

4. **C. Elkin**, Kumarasiri, D. B. Rawat, and V. Devabhaktuni, "Localization in wireless sensor networks: A Dempster-Shafer evidence theoretical approach," *Ad Hoc Networks* 54, pp. 30-41 (2017)

5. T. J. S. Chowdhury, **C. Elkin**, V. Devabhaktuni, D. B. Rawat, and J. Olouch, "Advances on localization techniques for wireless sensor networks: A survey," *Computer Networks* 110, pp. 284-305 (2016)

Articles in Conference Proceedings

6. **C. Elkin**, R. Bathla, T. Poplawski, S. Agashe, "Improved Prediction of Steel Hardness Through Neural Network Regression," *AISTech 2020*, pp. 40-45 (Nov. 2021)

7. A. A. Reyes, **C. Elkin**, Q. Niyaz, X. Yang, S. Paheding, and V. K. Devabhaktuni, "A Preliminary Work on Visualization-based Education Tool for High School Machine Learning Education," *2020 IEEE Integrated STEM Education Conference (ISEC)*, Princeton, NJ, pp. 1-5 (Aug. 2020)

8. **C. Elkin** and V. Devabhaktuni, "Comparative Analysis of Machine Learning Techniques in Assessing Cognitive Workload," *10th International Conference on Applied Human Factors and Ergonomics*, Washington, DC, pp. 27-37 (Jul. 2019)

9. S. Nittala, **C. Elkin**, J. Kiker, R. Meyer, J. Curro, K. Xu, V. Devabhaktuni, and A. Reiter, "Pilot Skill Level and Workload Prediction for Sliding-Scale Autonomy," *Proc. 17th IEEE Int. Conf. Machine Learning and Applications (ICMLA)*, Orlando, FL, pp. 1166-1173 (Dec. 2018)

10. **C. Elkin** and V. Devabhaktuni, "Analysis of Alternatives for Neural Network Training Techniques in Assessing Cognitive Workload," In: *9th International Conference on Applied Human Factors and Ergonomics (AHFE 2018)*. Orlando, FL, pp. 27-37 (Jul. 2018)

11. **C. Elkin**, S. Nittala, and V. Devabhaktuni, "Fundamental Cognitive Workload Assessment: A Machine Learning Comparative Approach," In: *8th International Conference on Applied Human Factors and Ergonomics (AHFE)*. Los Angeles, CA, pp. 275-284 (Jul. 2017)

12. B. Keneni, B. Austin, **C. Elkin**, and V. Devabhaktuni, "Educational prototype demonstrating frequency spectrum sharing through channel borrowing and priority assignment," In: *2017 IEEE International Conference on Electro Information Technology (EIT)*, Lincoln, NE, pp. 540-544 (May 2017)

Poster Presentations

13. **C. Elkin** and V. Devabhaktuni, "Verification of Physiological Data Collection," *Proc. 2016 Safe and Secure Systems & Software Symposium (S5)*, Dayton, OH (Jul. 2016)

Project/Thesis Co-supervision

Roosevelt University

- Arman Aubakir (M.S. project), 2025-present
  Topic TBD

- Karla Victorino (honors project for CST 378), 2025
  "Sophix: A Web-based Assistant for Matching Honors Program Courses"

Purdue University Northwest

- Joshua Cline (senior design), 2021-2022
  "Development of Game-Based Learning Modules for Freshman Engineering Design"

- Brooklyn Radtke (senior design), 2021-2022
  "Development of Game-Based Learning Modules for Freshman Engineering Design"

- Kameron Howard (senior design), 2021-2022
  "Machine Learning Analysis of Cognitive Workload for Assessing Post-pandemic Remote Workforce Models"
- Ryan McCormack (senior design), 2021-2022
  "Machine Learning Analysis of Cognitive Workload for Assessing Post-pandemic Remote Workforce Models"
- Jacob Wagner (senior design), 2021-2022
  "Machine Learning Analysis of Cognitive Workload for Assessing Post-pandemic Remote Workforce Models"
- Alex Quilty (honors project for ECE 27001), 2021
  "FPGA Digital Clock Using SystemVerilog"
- Yuchen Li (M.S. thesis), 2020-2021
  "Jamming Detection and Classification via Conventional Machine Learning and Deep Learning with Applications to UAVs"
- Wajahat Waheed (M.S. thesis), 2020-2021
  "Performance evaluation of Univariate Time Series and Deep Learning Models for Foreign Exchange Market Forecasting: Integration with Uncertainty Modeling"
- Isaiah Huppenthal (senior design), 2020-2021
  "Development of Immersive Simulation for Measuring Cognitive Workload with Physiological Data"
- Brandon Rathbone-Desch (senior design), 2020
  "Real-Time Prediction of Cognitive Workload Using Machine Learning Analysis of Physiological Data"
- Abel Andres Reyes Angulo (M.S. thesis), 2019-2021
  "Exploration of Novel Educational Tools Based on Visualization"
- Baylee Carpenter (senior design, undergraduate research), 2019-2020
  "Real-Time Prediction of Cognitive Workload Using Machine Learning Analysis of Physiological Data" & "Augmented Reality Scavenger Hunt"
- Alex Raynor (M.S. thesis), 2019-2020
  "Development of Machine Learning Techniques for Applications in the Steel Industry"
- Chris Gallo (senior design), 2019-2020
  "Adaptable Intramuscular Injection Device"
- Bradley Hill (senior design), 2019-2020
  "Adaptable Intramuscular Injection Device"
- Sarah Vavrek (senior design), 2019-2020
  "Adaptable Intramuscular Injection Device"
- Ryan Ellis (undergraduate research), 2019
  "Augmented Reality Scavenger Hunt"
- Regan Sink (undergraduate research), 2019
  "Augmented Reality Scavenger Hunt"
- Connor Yoder (undergraduate research), 2019
  "Augmented Reality Scavenger Hunt"
- Jacob Alva (senior design), 2018-2019
  "Data Acquisition to Determine Cognitive Workload"
- Santos Garay (senior design), 2018-2019
  "Data Acquisition to Determine Cognitive Workload"
- Bradley Colter (senior design), 2018-2019
  "Prediction of Cognitive Workload Using Machine Learning Analysis of Physiological Data"
- Matthew Pawlicke (senior design), 2018-2019
  "Prediction of Cognitive Workload Using Machine Learning Analysis of Physiological Data"