Academic Year 2024-2025 Self-Evaluation Darryl Chamberlain Jr.

Teaching (30%)

Teaching Goals and Objectives are guided by T&P Guidelines to stay on-track to earn Associate Professor title. These Goals and Objectives were reported in the AY23-24 Self-Evaluation and approved by department chair.

Teaching Goals

- <u>Teaching:</u> Provide exceptional teaching in my reduced teaching schedule. Include more personalized videos in announcements and feedback.
- <u>Program Development:</u> Develop Bachelor of Science in Data Science for MST
- <u>Course Development</u>: Continue improving courses I am Course Mentor for: MATH 111, MATH 112, MATH 502, CSCI 251, RSCH 395
- <u>Professional Development:</u> Develop as an educator by attending teaching-focused professional development.

Teaching Objectives

- <u>Teaching:</u> Average quantitative scores of Instructor Experience above 4.5 and above College average. Less than 10% of student free responses to Instructor Experience are neutral or negative.
- <u>Program Development:</u> Submit and have accepted a Bachelor of Science in Data Science.
- <u>Course Development:</u> Teach and redesign MATH 502 to address student complaints.
- <u>Professional Development:</u> Attend at least 1 national teaching-focused professional development opportunity.

Progress Towards Teaching Objectives

I achieved all teaching objectives outlined above with the exception of quantitative scores in a low-enrollment course, though all quantitative averages were at least 4.0. I also included more videos in announcements and as feedback to exams. Beyond the objectives above, I also engaged in 2 unexpected course developments (RSCH 395 and DSCI 411) and took on additional Course Mentoring responsibilities (DSCI 201, DSCI 411). Detailed reviews of each teaching objective category are provided.

Teaching

I taught 3 courses in AY 24-25:

- August 2024: Introduction to Programming for Data Science (CSCI 251) and Boundary Value Problems (MATH 502)
- January 2025: Boundary Value Problems (MATH 502)

This reduced teaching load was due to 5 course releases: 2 as Acting Chair (due to being unable to use the course releases while Acting Chair in 2024), 2 as Associate Chair, and 1 as a tenure-track faculty member.

When setting my goal of Instructor Experience above 4.5, I had been teaching primarily 100-level courses where student reviews are generally higher. I still met this expectation in the two MATH 502 courses despite heavy student criticism about the course, but the small sample size and difficulty of CSCI 251 meant I only got above 4.0. I did meet my goal of less than 10% neutral or negative Instructor Experience comments as I only received positive comments in the teaching effectiveness responses.

August 2024 Intro to Programming for Data Science Review

August 2024 CSCI 251 had 6 students finish the course and 3 students complete the course evaluation. Mean of Means for Course Experience (4.03), Delivery Mode (4.00), and Instructor Experience (4.15) were weighed down by 1 student. Comments to all questions were positive or were constructive criticism of the course. Exemplary comments include:

- *Professor Chamberlain was very knowledgeable on course material and exhibited an approachable dynamic to his teaching method.*
- *Mr. Chamberlain provided extensive knowledge and expertise throughout this course. I appreciated the weekly videos he created explaining the lessons and course material. They were clear and concise. He always made himself available.*
- *His pre-recorded material was very insightful for grasping course concepts, I just wish our course book was much more helpful for assignments as they were not very similar and had a lot of time relaying information to grasp the related concept.*
- *It is a very difficult course, especially for an introductory lesson in computer programming. I felt a more classical approach of lecture with a large course chapter book would have helped me understand the language early on in the course lesson. I relied heavily on outside sources such as Youtube for more lesson information.*

Reflecting on the scores and comments, it appears that while the material I created for the course is well-received and students appreciated my involvement in the course, the course textbook (a popular open-source introduction to data science textbook) could be replaced

with a more robust offering. I am actively looking for a new textbook, though may end up making supplementary materials for each module specific to what students hope to gain from the course. One immediate action I took was to create a validation script to help students evaluation one of their major projects. This validation script has been included in the August 2025 course being taught by Christy Reynolds and will be evaluated for effectiveness in later October.

August 2024 Boundary Value Problems Review

Due to student complaints from an adjunct instructor over multiple terms, I took over teaching Boundary Value Problems starting in August 2025. It had 17 students complete the course and 8 complete the end-of-course review. Mean of means for Course Experience (3.99), Delivery Mode (4.57), Instructor Experience (4.78), and student comments illustrate satisfaction with the instructor but less satisfaction with the course itself. Exemplary comments include:

- *Dr. Chamberlain is one of the best professors I have had at ERAU. He genuinely cares for students and wants them to succeed. He is willing to work with students and help them in whatever way he can. He used so many different ways of communicating and trying to help us. He was available and easy to work with.*
- *Dr. Chamberlain cares about the students' success. He was very responsive to student questions and concerns.*
- *Great professor for the class, especially with this course because MAN this course was the hardest class I've had in years. Dr. Chamberlain should change ALL the videos to his style because HE can teach this like its NOTHING, such a great professor!*
- *The course creator probably has no clue that not all of us are in Math major; we have profession work and family. Most student spend 20+ hours and yet failing to keep up. Please change the course for future students.*
- *This is one of the worst courses I have taken here yet. I feel like I had a hard time retaining what I learned and the coursework was not well designed for this course. The videos did not align with the quizzes and homework assignments. The quizzes were more of a guessing game rather than actually figuring out the solution. The end of module quizzes did not align at all with the practice problems. I feel like I learned maybe a quarter of what should have been learned. This was so incredibly challenging. The homework takes up too much time and does not actually teach. I am not happy with this course at all. I would not recommend this course to anyone.*
- *Dr. Chamberlain single handedly clutched this course, he was flexible with me and provided tons of feedback in order to see my succeed in this course.*

As illustrated above, students were generally frustrated with the course structure and overly challenged by the material itself. After numerous complaints about the time spent on tasks in the first week (30 hours average), I began carefully pruning assignments 1 week in advance as well as watching average time on assignments. Students were sent announcements keeping them informed of what I was doing, that I was watching, and were appreciative of the proactive approach I took to triaging the course. By Week 3 estimated assignment time was back down to a reasonable 12-15 hour average across all assignments per module and matched student average time for the rest of the term.

I made heavy revisions to the course due to these issues. First, Module 1 jumped straight into graduate-level mathematics that students were not ready for. The majority of students taking this course have had at least a few years (if not more) since taking their differential equations course MATH 502 builds on. Thus I took 2 core modules from our differential equations MATH 345 course and combined them to be the new Module 1. Theoretically, this would be the critical refresher students needed to not be inundated with relearning old content and learning new content that was resulting in 30-hour work averages in week 1.

Next, I removed the required synchronous oral midterm exam and replaced it with an asynchronous oral exam. The workload on the instructor to proctor 20+ synchronous oral exams that lasted 45-60 minutes in a single week was too much, especially since the majority of students needed to meet either in the evening or on the weekend. The structure of the asynchronous oral exam, where students see all questions and record short (5 minutes or less) video responses, should also reduce the amount of stress and anxiety students had watching me take notes as they answered questions. One of the other major complaints on assignments were discussions that did not have students engaging with one another and were far more advanced than necessary. Half of these were removed for reflective assignments that encouraged students to summarize concepts and the other were modified to reduce difficulty. Finally, a number of "list the steps needed to solve the PDE" questions were removed or revised to reduce student confusion. These questions were the most complained about parts of the homework and did not achieve the goal of reflective abstraction.

January 2025 Boundary Value Problems Review

The revised version of Boundary Value Problems had 20 students complete the course and 16 complete the end-of-course review. Mean of means for Course Experience (4.27), Delivery Mode (4.03), Instructor Experience (4.62), and student comments illustrate revisions to the course greatly improved the course. Exemplary comments include:
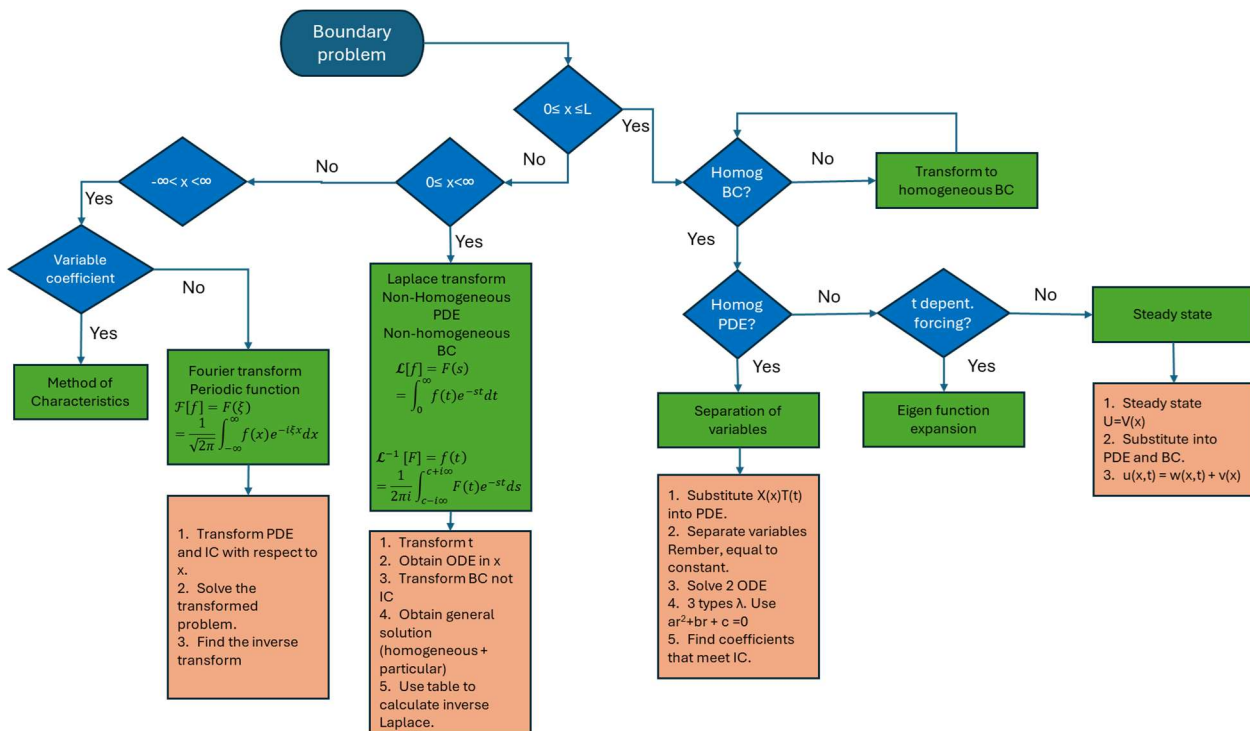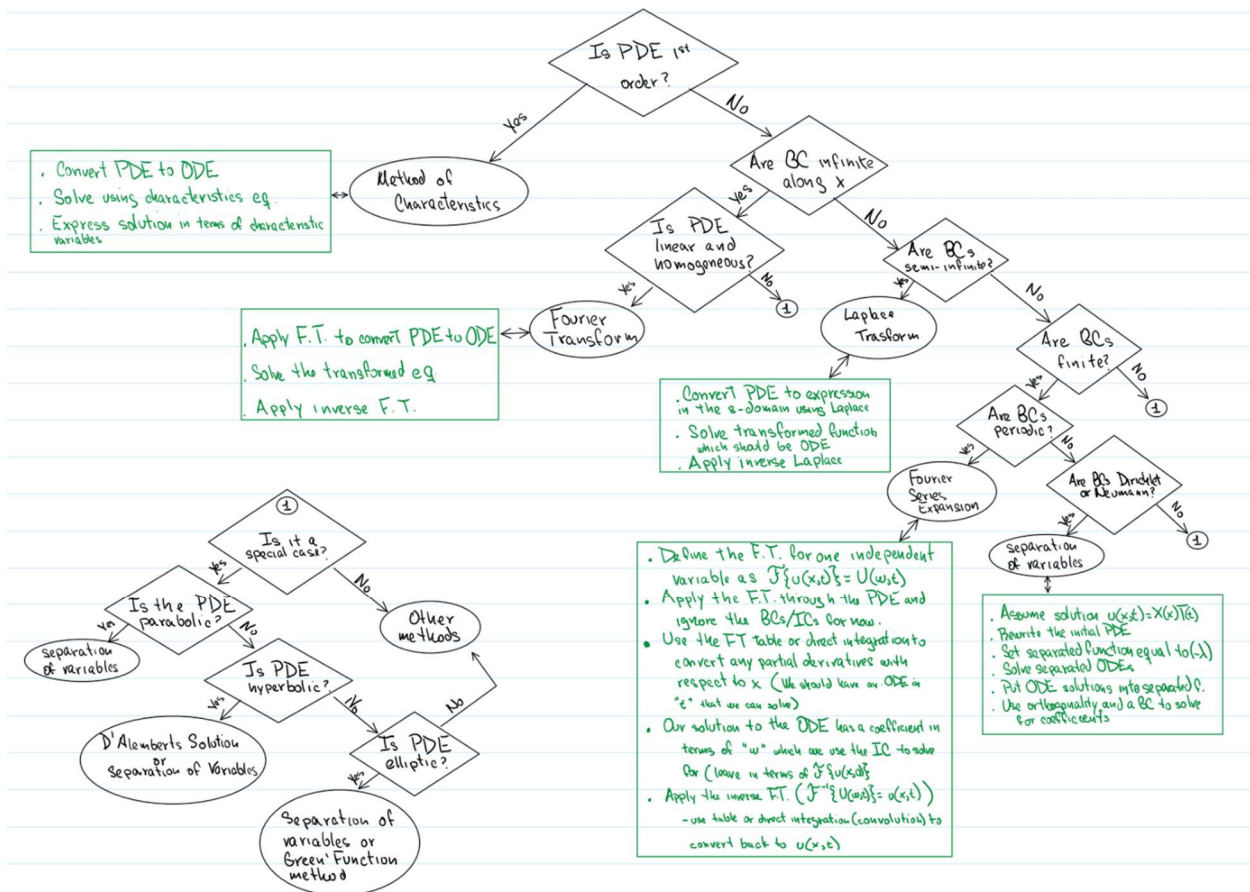
- *The professor was really good at explaining the content when I had questions. I was impressed by how open and adaptive he was with feedback from the class. He*

recognized that somethings weren't working and changed quickly to ensure we learned in a better way.

- *I wish every professor in Embry Riddle was like Dr. Chamberlain. He provided us with the necessary tools to be sucessfull in this class. This is one of the toughest contents I have worked with while at Embry Riddle. Professor Chamberlain showed mastery in the course's content. He was very quick in answering questions which is not very commun in Worldwide classes, according to my experience. Just an excellent professor!*

- *I would like a few more opportunities to network with my fellow students, other than that I had a lot of fun!*

- *My only suggestion would be to review the questions in the homework assigments. Some of the multiple choice questions were not clear, and the grading criteria was not specific enough for us students to make selection at times.*

- *While the professor was extremely helpful, there were a number of example problems and even Canvas solutions that were incorrect. I voiced my concerns to the professor and he agreed with my consensus that the answer pool was invalid. This happened throughout multiple modules causing extreme frustration and excess time attempting to learn something that wasn't possible. This course needs a rework and I believe Dr. Chamberlain has the expertise to be a valuable asset in doing so.*

Overall, the changes positively impacted the mood and quality of work in this second term. The Week 1 crash course was extremely well received, giving students time to focus on foundational knowledge that significantly improved student work in Weeks 2 and 3. Assignments that had students summarize course content were also well received to the point of being used on future assignments and the final exam, giving meaning to the assignments students were completing. For example, the best-received discussion post asked students to create a flow chart to solve any PDE covered in the prior 8 weeks of the course. While a few students made bullet lists with the essentials, at least half of the class created visual flow charts that they then compared with one another. Some of these were handwritten while others used programs to create professional flow charts. This led to genuine discussions about the course material and students expressed a wish for more assignments like it.

There is still student desire for the course material to be updated, but there is no longer a critical need to redesign the course.

PDE Solution Method Flowchart

Is PDE 1st order?
- **Yes** → Method of Characteristics
  - • Convert PDE to ODE
  - • Solve using characteristics eq.
  - • Express solution in terms of characteristic variables
- **No** → **Are BC infinite along x**
  - **Yes** → **Is PDE linear and homogeneous?**
    - **Yes** → Fourier Transform
      - • Apply F.T. to convert PDE to ODE
      - • Solve the transformed eq
      - • Apply inverse F.T.
    - **No** → ①
  - **No** → **Are BCs semi-infinite?**
    - **Yes** → Laplace Transform
      - • Convert PDE to expression in the s-domain using Laplace
      - • Solve transformed function which should be ODE
      - • Apply inverse Laplace
    - **No** → **Are BCs finite?**
      - **No** → ①
      - → **Are BCs periodic?**
        - **Yes** → Fourier Series Expansion
        - **No** → **Are BCs Dirichlet or Neumann?**
          - **Yes** → separation of variables
          - **No** → ①

Fourier Series Expansion notes:
- • Define the F.T. for one independent variable as $\mathcal{F}\{u(x,t)\} = U(\omega,t)$
- • Apply the F.T. through the PDE and ignore the BCs/ICs for now.
- • Use the FT table or direct integration to convert any partial derivatives with respect to x (We should leave an ODE in "t" that we can solve)
- • Our solution to the ODE has a coefficient in terms of "ω" which we use the IC to solve for (leave in terms of $\mathcal{F}\{u(x,0)\}$)
- • Apply the inverse F.T. ($\mathcal{F}^{-1}\{U(\omega,t)\} = u(x,t)$) – use table or direct integration (convolution) to convert back to $u(x,t)$

separation of variables notes:
- • Assume solution $u(x,t)=X(x)T(t)$
- • Rewrite the initial PDE
- • Set separated function equal to $(-\lambda)$
- • Solve separated ODEs
- • Put ODE solutions into separated P.
- • Use orthogonality and a BC to solve for coefficients

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① Is it a special case?
- **Yes** → **Is the PDE parabolic?**
  - **Yes** → separation of variables
  - **No** → **Is PDE hyperbolic?**
    - **Yes** → D' Alemberts Solution or separation of Variables
    - **No** → **Is PDE elliptic?**
      - **Yes** → Separation of variables or Green' Function method
      - **No** → Other methods
- **No** → Other methods

Boundary problem

0 ≤ x ≤ L
- **Yes** → **Homog BC?**
  - **No** → Transform to homogeneous BC
  - **Yes** → **Homog PDE?**
    - **Yes** → Separation of variables
      1. Substitute X(x)T(t) into PDE.
      2. Separate variables Rember, equal to constant.
      3. Solve 2 ODE
      4. 3 types λ. Use $ar^2+br+c=0$
      5. Find coefficients that meet IC.
    - **No** → **t depent. forcing?**
      - **Yes** → Eigen function expansion
      - **No** → Steady state
        1. Steady state U=V(x)
        2. Substitute into PDE and BC.
        3. u(x,t) = w(x,t) + v(x)
- **No** → **0 ≤ x < ∞**
  - **Yes** → Laplace transform Non-Homogeneous PDE Non-homogeneous BC
    $$\mathcal{L}[f] = F(s) = \int_0^{\infty} f(t)e^{-st}dt$$
    $$\mathcal{L}^{-1}[F] = f(t) = \frac{1}{2\pi i}\int_{c-i\infty}^{c+i\infty} F(t)e^{-st}ds$$
    1. Transform t
    2. Obtain ODE in x
    3. Transform BC not IC
    4. Obtain general solution (homogeneous + particular)
    5. Use table to calculate inverse Laplace.
  - **No** → **-∞ < x < ∞**
    - **Yes** → **Variable coefficient**
      - **Yes** → Method of Characteristics
      - **No** → Fourier transform Periodic function
        $$\mathcal{F}[f] = F(\xi) = \frac{1}{\sqrt{2\pi}}\int_{-\infty}^{\infty} f(x)e^{-i\xi x}dx$$
        1. Transform PDE and IC with respect to x.
        2. Solve the transformed problem.
        3. Find the inverse transform

Program Development

The Bachelor in Data Science was officially approved and launched in July 2025. By August 1 2025, the degree already had 5 declared students. While negotiating the approval of the degree was difficult due to one-university initiatives to have nearly identical degrees on each campus, it ultimately appears off to a strong start.

Course Development

As detailed in the Teaching subsection, MATH 502 underwent some small but critical changes that completely changed student perception of the course and significantly reduced student complaints. I consider this to be a successful course update.

I engaged in significant, unexpected course development due to the sudden departure of the only other Data Science faculty member and departure of a tenured faculty member. This resulted in me developing RSCH 395 (Publication-Ready STEM Research) in August 2024 and an accelerated co-development of DSCI 411 (Applied Data Science Capstone) in January 2025 with Tim Smith. Both courses are now part of the Bachelor in Data Science curriculum while the RSCH 395 course is also part of the newly-approved Research Foundations minor.

Professional Development

In keeping with the goal of attending one teaching-oriented conference, I attended two this year: American Association of Colleges and Universities 2024 Transforming STEM Higher Education Conference and Intersections: Online Learning and Innovation in Higher Education. While I presented practitioner-oriented research at each, I also attended numerous talks to learn about issues facing STEM educators. The most frequent topic this year was (unsurprisingly) Generative AI. With that in mind, I plan to create informational materials about AI and Generative Ai targeted towards practitioners in AY25-26.

Scholarly Activity (40%)

Scholarly Activity Goals and Objectives are guided by T&P Guidelines to stay on-track to earn Associate Professor title. These Goals and Objectives were reported in the AY23-24 Self-Evaluation and approved by department chair.

Research Goals

- Grants: Continue seeking internal and external grant opportunities, when appropriate for a project.
- Publications: Continue submitting publications for peer-review.

- <u>Presentations:</u> Continue presenting at national conferences.

Research Objectives

- <u>Grants:</u> Submit at least 1 external grant based on prior internally funded project.
- <u>Publications:</u> Submit at least 2 peer-reviewed publications, with at least 1 being a solo publication or first-author.
- <u>Presentations:</u> Present at least once at a national conference.

Progress Towards Research Objectives

Research production far exceeded Research Objectives. I was PI on two external grant submissions (NSF and Spencer Foundation, both unfunded) and co-PI on one internal grant submission (ERAU FIRST grant, funded). I was part of 10 research paper submissions: 3 book chapters (2 published, 1 abstract rejected), 4 conference proceedings (2 accepted, 2 rejected but accepted as posters), 3 journal articles (1 minor revisions decision, 1 rejected due to journal fit, 1 still under review). I was part of 9 conference presentations: 1 international (Canada), 5 national (3 as lead author) and 3 local (1 as lead author). I was also invited to speak at a seminar series at my alma mater Georgia State University. I was also part of a white paper submission that discussed how faculty engage in students-as-partners work that was published in a journal, though as a non-research paper I have not included the details in the lists below.

All research efforts utilized my research expertise in Educational Data Science. In all grants except the *Adaptive Assessments in Calculus* grant/paper, I was the only researcher that could complete the large-scale data management as well as provide the descriptive and predictive statistics necessary for all results, core data scientist roles in education research. In the *Adaptive Assessments in Calculus* grant/paper, I acted as a bridge between the practicing mathematician instructor and data scientist to ground predictive features in cognitive theoretical frameworks practical to educators in College Algebra and Calculus.

Grants

As I was in year 2 of 3 in an active NSF grant (Research Scholars Program), my initial plans for the year were to only submit one additional NSF grant with 2 former colleagues at Georgia State University (GSU). This grant, *Collaborative Research: Adaptive Assessments in Calculus*, targeted the NSF Improving Undergraduate STEM Education (IUSE) for about $400,000. It would have explored applying machine learning algorithms to experiential student data to create diagnostic, formative, and summative assessments to improve the teaching and learning of Calculus at GSU. I was the educational research expert on the

team with a background in creating automated assessments that target student knowledge. While the grant was unfunded, it received a "Competitive" panel recommendation with ratings of 4/5, 3/5, and 4/5. We plan on resubmitting the grant with the panel's recommended revisions in AY 25-26.

As chair of the MAA Subcommittee on Technology in Mathematics Education, I was an advisor to internal MAA discussions on the impact of Generative AI in mathematics education. These conversations led to me meeting with senior leadership in MAA and planning a private grant to fund a special symposium to generate knowledge around GenAI in mathematics education for about $72,000. While the grant was unfunded, the grant submission team will again be meeting at MAA MathFest in August 2025 to plan a similar future submission. I will likely be PI again on this future submission.

One of ERAU's new hires, Emily Dux Speltz, approached me in October 2024 to be the data science expert on a proposed internal FIRST grant to support the future development of an innovative artificial intelligence-based writing technology that provides real-time, process-focused guidance and feedback to college-aged students. The project was well-received with one reviewer writing:

> This is one of the best research proposals I have ever reviewed; it is well-written, supported by peers and by extent literature, is aligned with the university's strategic goals, and is positioned to produce a deliverable that not only significantly aids in student success but also continues to uphold the ERAU brand of excellence.

This grant began work in July 2025 and will conclude in the 25-26 academic year.

Publications

Publications and my contributions to each are listed below, including description of relevance to Educational Data Science discipline. All rejected publications include a plan to address deficiencies and submit again in the future. Copies of each publication are attached to the self-evaluation for review.

Accepted Publications

- **Book Chapter - 2nd author of 3:** A Framework for Analyzing Asynchronous Discussion Activities. *Teaching and Learning Mathematics Online 2e*. Accepted November 2024.
  My Contributions: Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Software, Visualization, Writing - Original Draft, Writing - Review & Editing.
  Relevance to Discipline: Mixed-methods data analysis of discussion posts with

inclusion of graphs to explain proliferation of concepts between discussion interactions.

- **Book Chapter - 3rd author of 4:** Black Boxes Revisited: Understanding GenAI Responses to Students' Written Work. *Thresholds in Education*. Accepted December 2024.
  My Contributions: Data Curation, Formal Analysis, Methodology, Writing - Original Draft.
  Relevance to Discipline: Descriptive statistical analysis of GenAI grading pattern as well as Monte Carlo experiment to confirm non-random GenAI grading pattern exists.

- **Journal Article - 1st author of 3:** Structural Framework for Interactions Between Community of Inquiry Presences, Cognitive Load, Demographics, and Grades. *Active Learning in Higher Education*. Accepted with Minor Revisions February 2025.
  My Contributions: Data Curation, Formal Analysis, Methodology, Visualization, Writing - Original Draft, Writing - Review & Editing.
  Relevance to Discipline: Machine Learning factor analysis models (EFA, CFA, SEM) of qualitatively coded STEM discussion data and survey responses.

- **Conference Proceeding Paper – 3rd author of 3:** Exploring the Efficacy of Virtual Research Mentorship for Online Undergraduate Projects. *Distance Learning Administration (DLA) 2025 Annual Conference and Exposition*. Accepted February 2025.
  My Contributions: Data Curation, Formal Analysis, Investigation, Methodology, Visualization, Writing - Original Draft, Writing - Review & Editing.
  Relevance to Discipline: Statistical tests to compare mentor and mentee perceptions of effective mentorship across 6 subscales.

- **Conference Proceeding Paper – 5th author of 5:** Impact of the COVID-19 Pandemic on Online Student Interest and Engagement in Undergraduate Research. *American Society for Engineering Education (ASEE) 2025 Annual Conference and Exposition (Canada)*. Accepted February 2025.
  My Contributions: Formal Analysis, Visualization, Writing - Original Draft, Writing - Review & Editing.
  Relevance to Discipline: Statistical tests to compare pre- and post-COVID students' interests in undergraduate research.

Rejected Publications

- **Special Issue Chapter – 3rd author of 11:** Actionable Insights for GenAI Integration in Higher Education: Cross-Institutional Experiential Learning and Interdisciplinary Feedback Assessment. *MIT Open Learning*. Positive rejection note, but only 6.8% of

abstracts were selected for full submissions. Paper has been restructured and planned for AY 25-26 submission to an appropriate journal.

My Contributions: Data Curation, Formal Analysis, Writing - Original Draft.

Relevance to Discipline: Descriptive statistical analysis of GenAI grading pattern as well as Monte Carlo experiment to confirm non-random GenAI grading pattern exists.

- **Conference Proceeding Paper – solo author:** Choices You Make Should Matter: Asynchronous Discovery Activities. *27th Annual Conference on Research in Undergraduate Mathematics Education: SIGMAA on RUME*. Converted and accepted as a poster presentation to the same conference.

  My Contributions: All.

  Relevance to Discipline: Theoretical framework for predicting and responding to student in-the-moment thinking during a mathematics word problem.

- **Conference Proceeding Paper – 1st author of 3:** Distractor-Based Distractors: Adventures in Assessment Item Analysis. *27th Annual Conference on Research in Undergraduate Mathematics Education: SIGMAA on RUME*. Converted and accepted as a poster presentation to the same conference.

  My Contributions: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Project Administration, Software, Visualization, Writing - Original Draft, Writing - Review & Editing.

  Relevance to Discipline: Descriptive and predictive statistics (logistic regression) to evaluate mathematics assessment items.

- **Journal Article – 1st author of 3:** *Towards an Integrated Methodology for Assessing Item Discrimination in Mathematics Assessments*. Research & Practice in Assessment. Rejections from qualitatively-focused mathematics education journal for not enough qualitative framework and from educational assessment journal for mixed-methods approach to item discrimination analysis. Targeting a practitioner journal for paper submission in AY 25-26.

  My Contributions: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Project Administration, Software, Visualization, Writing - Original Draft.

  Relevance to Discipline: Descriptive and predictive statistics (logistic regression) to evaluate mathematics assessment items.

Presentations

International

- **(2025, Jun 22) Conference Proceeding Paper Presentation – 5ᵗʰ author of 5:** Impact of the COVID-19 Pandemic on Online Student Interest and Engagement in Undergraduate Research. *American Society for Engineering Education (ASEE) 2025 Annual Conference and Exposition (Canada).* Accepted February 2025.
  My Contributions: Formal Analysis, Visualization, Writing - Original Draft, Writing - Review & Editing.
  Relevance to Discipline: Statistical tests to compare pre- and post-COVID students' interests in undergraduate research.

National

- **(2025, Jul 30) Conference Proceeding Paper Presentation – 3ʳᵈ author of 3:** Exploring the Efficacy of Virtual Research Mentorship for Online Undergraduate Projects. *Distance Learning Administration (DLA) 2025 Annual Conference and Exposition.* Accepted February 2025.
  My Contributions: Data Curation, Formal Analysis, Investigation, Methodology, Visualization, Writing - Original Draft, Writing - Review & Editing.
  Relevance to Discipline: Statistical tests to compare mentor and mentee perceptions of effective mentorship across 6 subscales.
- **(2025, Feb 27) Conference Proceeding Poster Presentation – solo author:** Choices You Make Should Matter: Asynchronous Discovery Activities. *27th Annual Conference on Research in Undergraduate Mathematics Education: SIGMAA on RUME.*
  My Contributions: All.
  Relevance to Discipline: Theoretical framework for predicting and responding to student in-the-moment thinking during a mathematics word problem.
- **(2025, Feb 27) Conference Proceeding Poster Presentation – 1ˢᵗ author of 3:** Distractor-Based Distractors: Adventures in Assessment Item Analysis. *27th Annual Conference on Research in Undergraduate Mathematics Education: SIGMAA on RUME.*
  My Contributions: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Project Administration, Software, Visualization, Writing - Original Draft, Writing - Review & Editing.
  Relevance to Discipline: Descriptive and predictive statistics (logistic regression) to evaluate mathematics assessment items.
- **(2025, Feb 19) Conference Presentation – 1ˢᵗ author of 2:** Longitudinal Impacts Analysis of Course Designs on Future Course Success. *Intersections: Online Learning and Innovation in Higher Education*, Orlando, FL.
  My Contributions: Conceptualization, Data Curation, Formal Analysis,

Investigation, Methodology, Project Administration, Software, Visualization, Writing - Original Draft, Writing - Review & Editing.
Relevance to Discipline: Descriptive and predictive statistics (random forest classification) to evaluate predictive features of success in subsequent courses.

- **(2025, Nov 7) Conference Presentation – 1st author of 4:** Cultivating Cyber Scholars: Research Support for Online STEM Students. *American Association of Colleges and Universities (AAC&U) 2024 Transforming STEM Higher Education Conference*, Arlington, VA.
  My Contributions: Data Curation, Formal Analysis, Investigation, Methodology, Visualization, Writing - Original Draft, Writing - Review & Editing.
  Relevance to Discipline: Statistical tests to compare mentor and mentee perceptions of effective mentorship across 6 subscales.

Local

- **(2025, Apr 16) Conference Presentation – 1st author of 3:** Who Assesses the Assessments? Methodology for Classifying Assessment Items. *2025 Division of Academic Innovation (DAI) Virtual Conference* (virtual).
  My Contributions: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Project Administration, Software, Visualization, Writing - Original Draft.
  Relevance to Discipline: Descriptive and predictive statistics (logistic regression) to evaluate mathematics assessment items.

- **(2025, Apr 15) Conference Presentation – 5th author of 8:** Navigating the Frontier: Innovations and Insights in AI Research and Education. *2025 Division of Academic Innovation (DAI) Virtual Conference* (virtual).
  My Contributions: Data Curation, Formal Analysis, Methodology, Writing - Original Draft.
  Relevance to Discipline: Descriptive statistical analysis of GenAI grading pattern as well as Monte Carlo experiment to confirm non-random GenAI grading pattern exists.

- **(2025, Feb 14) Conference Presentation – 2nd author of 2:** Promoting Argumentation and Discourse in Mathematics Courses. *3rd Annual Humanistic STEM Symposium, Daytona Beach, FL* (virtual).
  My Contributions: Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Software, Visualization, Writing - Original Draft, Writing - Review & Editing.
  Relevance to Discipline: Mixed-methods data analysis of discussion posts with

inclusion of graphs to explain proliferation of concepts between discussion interactions.

Service (30%)

Service Goals and Objectives are guided by T&P Guidelines to stay on-track to earn Associate Professor title. These Goals and Objectives were reported in the AY23-24 Self-Evaluation and approved by department chair.

Service Goals

- Department level: Continue working as Associate Department Chair and as an active member of MST.
- College level: Contribute to any college-level initiatives I have expertise in and am eligible to work in.
- University level: Continue work as Chair of the WW Senate Academic Technology Committee.
- Professional Society level: Continue leadership involvement in MAA and RUME.

Service Objectives

- Department level: Complete all tasks assigned to me as Associate Department Chair and any other assigned tasks as a department member.
- College level: Contribute to one college-level initiative such as faculty mentorship.
- University level: Complete all tasks assigned to me as Chair of the WW Senate Academic Technology Committee.
- Professional Society level: Generate 2 products as chair of the MAA Subcommittee on Technology in Mathematics Education and run for a leadership position in RUME.

Progress Towards Service Objectives

I achieved all service objectives for AY24-25 while completing additional, unanticipated ERAU service in the form of chairing a search committee for a new tenure-track physical science faculty member as well as taking over responsibilities for the Minor in Applied Data Science. I also continued to raise my national profile with networking within MAA and RUME, leading to inclusion in an informal meet-and-greet (~20 people) and formal dinner (~8 people) with a representative of the Gates Foundation on behalf of the MAA. My rising profile also led to a formal invitation in July 2025 by the MAA Special Interest Group RUME to run for the Executive Committee in Fall 2025.

Department

As Associate Department Chair, I provided our new department chair Tim Smith relevant background information and summaries of prior department activity as he led the department. I also completed necessary Associate Department Chair tasks in a prompt and thorough manner.

Due to the number of search committees MST needed to launch in Fall 2024, I was asked to lead the Physical Science tenure-track search committee. The committee did excellent work reviewing the broad range of candidates that applied, resulting in numerous Zoom interviews and narrowing down candidates for in-person interviews. While no hire resulted from the search, this was due to the pool of candidates and not on the performance of the committee.

Given the sudden departure of the other Data Science tenure-track faculty member, I took over the minor in Applied Data Science in January 2025. I immediately developed internal fliers to build interest in the minor and continued to address issues with prerequisites of courses in the minor as well as issues with one-university initiatives.

College

In fall 2024, I was asked to be Emily Dux Speltz's faculty mentor for AY2024-2025. While no formal guidance was provided, we met as-needed to provide guidance on navigating ERAU and especially how to target research funding. This resulted in a successful FIRST grant submission (discussed in the research section) that should provide Emily with key funding in her inaugural year. Emily was made PI so she could be supported in learning about the administrative needs of leading a grant, including how to solicit and hire student researchers as well as navigating paying research participants.

University

In my final year as chair of the ERAU-WW Senate Academic Technology committee, I participated in the hiring committee for Director of IT Service Management & Worldwide IT Services. I also provided advice on the ERAU website redesign process and the End-of-Course Faculty Evaluation redesign.

Professional Society

I finished my 3rd year as chair of the MAA Subcommittee on Technology in Mathematics Education in AY 24-25. As chair, I organized the committee in producing two products: a short MAA Focus article (white paper) and organizing a conference paper session. I led the MAA Focus article and we successfully submitted an article that has been accepted and will be published in the August/September 2025 issue. In addition, I was added as a

technology advisor to numerous MAA talks on Generative AI in mathematics education. This led to me being PI in a collaborative grant with MAA. My elevated exposure to the MAA leadership team also led to me being invited to represent upcoming MAA members in an informal meet and greet (~20 people invited) and a formal dinner (~8 people invited) with a Gates Foundation representative. While no outcomes have happened from the meetings, it illustrates my rising status as a leader in the MAA community.

Finally, another illustration of my rising status occurred in July 2025 when the special interest group RUME invited me to run for the executive committee (email attached).