



The Annual Report for Applied Critical Thinking at RIT

for

2024 - 2025

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Eugene H. Fram Chair in Applied Critical Thinking
2025

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Executive Summary

In 2024-25, the Applied Critical Thinking initiative at the Rochester Institute of Technology (ACT@RIT) continued under the leadership of Dr. Jennifer L. Schneider. The application of critical thinking is a key skill in the age of artificial intelligence and must be integrated into our AI initiatives. This year, the Fram ACT efforts expanded to build a partnership with the RIT AI Hub, under the direction of Dr. Chris Collision. Many of our 26 events integrated critical thinking with AI, and we had a record year of engagement, with over 1,400 registered participants. Major accomplishments include: Signature event expanded to 4 days with 1000 participants; 4 MIND Fields for all campuses' faculty & Fulbright Foundation, RIT Dubai PIL program, etc. Working with the assessment office and faculty, the Fram office completed the collection of student data for ACT outcomes for student success. The results were excellent and demonstrate that ACT is a strength and a leading outcome set for the university. 86% of students met/exceeded gen ed benchmark (U bench is 70%) across outcomes, and 88% of students met/exceeded benchmark in program courses (we piloted assessments of two outcomes in program courses spanning yr1 to 5). 79% of co-op employers rated critical thinking ability as very good or higher, with only 3% of employers rating the capacity as fair/poor. Ninety-two percent of seniors rank related confidence in critical thinking as 'Quite a bit' or higher. The data shows that critical thinking-related skills are ranked highest by RIT seniors, actually higher than research, writing, speaking, and tech. Finally, our efforts in alumni ratings (AAS survey) show the highest rankings for critical (3.3/4) and creative and innovative thinking (3.17/4), above quantitative reasoning (3.01/4). RIT Fram partnered with the Ohio State, University of Florida to submit an NSF STEM proposal. The THINKING peer university group hosted a virtual symposium (I am STEM) that attracted 60 participants (9/6/24) and a series of fall workshops, and submitted an NSF collaborative grant proposal, Inclusive Accessibility Movement (I AM) in STEM: Transformative Thinking in Action.

For this academic year, faculty reported 702 scholarly artifacts. Of those artifacts, the faculty designated 157 (22%) artifacts as ACT. The opportunity to leverage our ACT@RIT initiative to advance RIT on many fronts is apparent. The academic year 2025-26 focus areas will be:

- **Continued focus on AI and critical thinking:** As AI permeates our programs and our society, it is important that students understand the balance of AI thinking with us or for us. The ACT effort at RIT is a key process to support university aims and student success, specifically for guiding both the technical capacity (use of AI in domains and generally) and for critical thinking about the role of AI in our professions and our lives.
- **Visibility, recognition and continuous improvement:** Guided by data, three Fram advisory boards and RIT leaders to advance ACT goals through events and faculty, student, and community engagement, especially as we assess our learning outcomes around AI. As the university's strategic framework comes into focus, the Fram Strategic Action Plan will be updated to reflect the university's aims. It is our goal that every RIT grad is recognized by employers for their abilities in critical thinking. RIT is rigorously moving toward that goal, recognizing that the application of critical thinking becomes even more important as a differentiator in the age of AI. As RIT continues to climb in university ranking, it is important that we build and showcase these important university efforts
- **Student success:** Building on our strong results, we will focus on creating a deeper

faculty MIND Field ‘toolbox’ training for both Rochester & international campuses, and continue to support the selected rollout of gen ed redesign across RIT.

- **Collaborations and scholarship:** Increase connections across university and external partner initiatives and educational experiences. Create a critical thinking and problem-solving training course for external audiences through RIT Certified. Create an employer version of a critical thinking introductory resource. Seek additional external funding opportunities, and complete a publication related to the ecosystem of applied critical thinking.
- **Complementary learning:** Leverage the applied critical thinking process for the growth of RIT Certified and other complementary ways of learning, such as Mind Fields, cross-campus opportunities, and collaborative programming for other RIT entities (The SHED, 365, k12, etc.).

Purpose and Guiding Aims

The purpose of this report is to summarize the ACT efforts and accomplishments for the 2024-25 academic year, list recommendations for future efforts, and define benchmarks for the ongoing evaluation of our progress. Establishing RIT's reputation as a national leader in Applied Critical Thinking relies on a university-wide commitment, coupled with notable external contributions to the development of Applied Critical Thinking. To ensure success, the university is (1) continuously improving a process grounded in performance measures and student achievement assessment, (2) continually seeking and sharing best practices and opportunities with internal and external partners, (3) integrating high-quality ACT learning opportunities across the student and community experience, and (4) facilitating excellence in the development of Applied Critical Thinking in our students and our world.

Initiative Framing and Rationale

Our global society has high expectations. Decision-makers must think critically to assess and strategize within complex, interconnected systems; continually adapt to rapidly evolving technological, aesthetic, and social environments; and manifest new ideas, both individually and collectively. In response, RIT created the **Applied Critical Thinking (ACT@RIT)** initiative to foster the application of critical thinking – in short, *the exercising of effective thinking in any context*. **Application of critical thinking connects this performance chain of knowing-doing-creating**. The initiative is guided by several working definitions, including:

- **RIT University Education Goal and Essential Program Outcome: Critical Thinking** refers to those processes required to understand and evaluate complex claims of various sorts. It involves evaluating information, evidence, arguments, theories, and the context in which these are encountered. It entails questioning different and competing perspectives and challenging the (sometimes hidden) assumptions and inferences that determine what will count as evidence or argument. Critical thinking is learning to think in a disciplined and evaluative manner, to analyze and interpret the processes by which various claims are made and reliable conclusions are reached ([RIT Essential Outcomes](#)).
- **Critical Thinking Across the Curriculum: Critical thinking is** “the ability to identify, analyze, construct, and evaluate evidence and arguments in a deliberate and rigorous way” or “The growth of educated thinking” (C. Sheffield, Critical Thinking Across the Curriculum Report, 2014).
- **Fram Advisory Board:** “At RIT, ACT is an active form of engagement, drawing from our diverse domains and deep expertise to address the questions and challenges that we face. As the uncertainties and the magnitude of impacts increase in our complex world, we must now consider a wider range of possible outcomes. To do this well, we need to employ thinking that draws from multiple, diverse environments to more fully inform our evaluation and resultant strategies.” (Fram Advisory Board. [Fram Award at Imagine](#)).

2024-25 Management & Structure of the Initiative:

The ACT initiative is led by the Eugene H. Fram Chair, who compiles the report in Applied Critical Thinking (Fram Chair), Dr. Jennifer L. Schneider, CIH. In addition to her role as the Fram Chair, Dr. Schneider is also a professor in Civil Engineering Technology, Environmental Management, and Safety within the College of Engineering Technology at RIT and leads the cross-disciplinary Collaboratory for Resiliency & Recovery at RIT. She has expertise in HAZMAT, risk-based decision-making, and global resilience. The internal Fram Advisory Board (FAB) of Rochester faculty and staff, the Fram alumni-driven Executive Advisory Board (FEAB), and the International Fram Advisory Board (IFAB) all advise Dr. Schneider. Ms. Jennifer DiLucia, Senior Staff Assistant, provided part-time administrative support. Further information on the history of the Fram/ACT initiative can be found in Appendix 1.

Fram Advisory Board (FAB)

Most members of the Fram Advisory Board chose to remain on the board for 2024-25 (Table 1). This board represents colleges, degree-granting units, and Student Affairs. The board members' duties are to guide Rochester-based ACT efforts and advocate for/be a conduit for ACT@RIT.

| Table 1: 2024-25 Fram Advisory Board | |
|--------------------------------------|---|
| <u>Name</u> | <u>Dept./College</u> |
| Daniele Brown | Student Affairs |
| Cory Crane | College of Health and Sciences Technology |
| Mike Eastman | College of Engineering Technology/Associate Dean Representative |
| Christine Keiner | College of Liberal Arts |
| Gina Ferrari | College of Art & Design |
| Sylvia Perez-Hardy | Golisano College of Computing & Information Sciences |
| Tony Harkin | College of Science |
| Gregory Babbitt | College of Science |
| Dorin Patru | Kate Gleason College of Engineering |
| Rick Lagiewski | Saunders College of Business |

International Fram Advisory Board (IFAB)

The International Fram Advisory Board represents RIT's international campuses (Table 3). These board members bring an international point of view and guidance to the initiative. The current members serving renewable terms are:

| Table 3: 2024-25 International Fram Advisory Board | |
|--|---------------|
| <u>Name</u> | <u>Campus</u> |
| Leandrit Mehmeti | RIT Kosovo |
| Francis Brassard | RIT Croatia |
| Jamaal Pitt | RIT Dubai |
| Jude Okpala | RIT China |

Fram Executive Advisory Board (FEAB)

The Fram Executive Advisory Board is selected from RIT's notable alumni (Table 2). These board members bring an external point of view and guidance to the initiative. Pamela Morison joined the advisory in spring 2025. The current members are:

| Table 2: 2024-25 Fram Executive Advisory Board | | |
|--|---|--|
| <u>Name</u> | <u>College/Degree</u> | |
| Peter Bealo | Photographic Science, BS 1980 | Consultant in Data Analysis, Public Education Policy, Marketing & Project Management |
| Joseph Boyd | Chemistry, BS 1977 | CEO, Financial Advisor, Boyd Capital |
| Robert Jacoby | Civil Engineering Technology, BS 1977 | Consultant, Former Global Manager at Royal Dutch Shell |
| Ellen Moser | Computer Technology, Software Science, BS 1981 | Treasurer, East County Fellowship Former Executive Director, Kaiser Permanente |
| Chris Petescia | Graphic Design, BFA 2005 | Owner, Kessel Run Ventures |
| William Standwill | Graphic Arts & Photography; Printing Management & Sciences, Graphic Communications, BS 1988 | Head of Commercial, Sherlock Biosciences |
| Krista Vardabash | Saunders College of Business, EMBA 2012 | Corporate Strategy Analyst, ESL Federal Credit Union |
| Amanda J. Weissman | Electrical Engineering; Materials Science, BS/MS 2009 | Lead Systems Engineer, Lockheed Martin |
| Pam Morison | Mechanical Engineering, MS/BS 2005 | Distinguished Technologist/Chief Technologist, Office Print, Hewlett-Packard |

General Education and Program Student Learning Outcomes

The teaching and assessment of ACT@RIT is managed through a comprehensive general education and program strategy founded on student learning and program goals. General education outcomes are codified by governing committees and adopted. The abbreviated outcomes are listed in the professional practice column of the chart below because these inform the building of a competent, professional, and capable critical thinker. The full description of ACT student learning outcomes is in Appendix 2. RIT measures student critical thinking at several opportunities along the student experience as follows:

- University-level Essential Program Outcomes assessed in designated general education courses
- Program learning outcomes
- Cooperative employer feedback
- National Survey of Student Engagement
- RIT's alumni survey

RIT systematically integrates critical thinking across the student experience to develop critical thinking in diverse settings. ACT@RIT is cultivated through learning the value of *defining* the quality of information, *analyzing*, *developing* a point of view, *solving* complex problems, and *creating*. These elements are embedded into our curriculum and practiced intentionally in ever broadening and diverse environments of experiential learning. RIT's renowned experiential learning program, the prolific use of projects and teams, community service programs, international experiences and programs, entrepreneurship and research opportunities, and participation in student groups in and out of the classroom are all valuable to the initiative. The ACT skills students develop transfer into every other area of life and are the impetus for growth, professionalism, and creative expression, empowering our alums to realize their unique contribution to our world through whatever path they choose or create. The visual map of the effort is below:

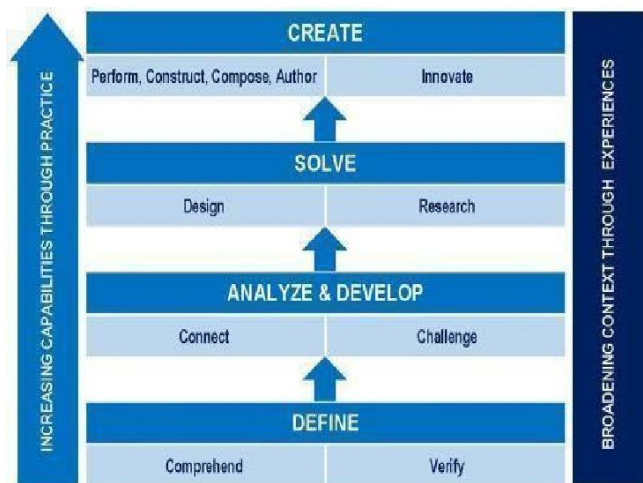


Figure 1: ACT Skill Development Map

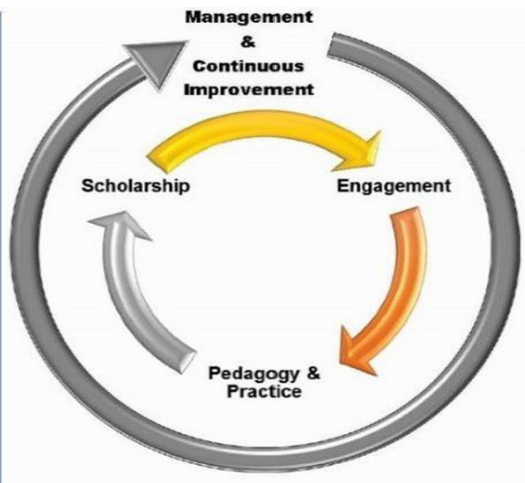


Figure 2: ACT Outcomes Map

Applied Critical Thinking Strategic Action Plan (2022-25)

[The Applied Critical Thinking \(ACT\) Strategic Action Plan \(SAP\) for 2022 -25](#) is meant to guide the ACT initiative and reflect ACT-related goals of the Rochester Institute of Technology (RIT) Strategic Plan for 2025. As an initiative focused on a core 21st-century skill uniquely manifested by RIT, the ACT effort directly supports university goals and the growth of the university's programming and reputation. It is also crucial to the blending and growth of the unique capabilities of RIT. ACT plays a particular formative role in these university goals:

- **GOAL 1:** Enroll and support a diverse mix of increasingly creative, multi-talented students.
- **GOAL 4:** Continue to attract and retain world-class faculty committed to elevating RIT's collective excellence in scholarship, teaching, and service.
- **GOAL 8:** Design and integrate unique curricular experiences at the intersection of RIT's programs in Technology, Art, and Design (TAD). Design new and revise existing programs in non-STEM disciplines that increase enrollment through this same distinctive integrated core.
- **GOAL 16:** Create a distinctive RIT brand and develop a supporting content marketing strategy that makes use of all relevant media.

The Strategic Action Plan (SAP) is through 2025 and corresponds to the university's strategic plan and will be updated to reflect the new university strategic framework when that is issued. The SAP is a guidance document reflected in the annual plans of work for the Fram Chair office.

Highlights of Accomplishments in 2024-2025

Highlights include:

- **Events and engagement:** Signature event expanded to 4 days, 1000 participants; In total, over 1400 participated in 26 events over the yr, including 4 MIND Fields for all campuses faculty & Fulbright foundation, RIT Dubai PIL program, and AI Hub Collaboration; Fram has significant communication presence, including website with events, resources, Fram award at Imagine processes, advisory boards, etc. Fram also maintains a university critical thinking clearinghouse stance and creates/sends monthly Fram Focus newsletters, tweets, summer reading list, and a community of practice that totals 106, with 8 added this year.
- **Learning Outcomes:** Working with the assessment office and faculty, the Fram office completed the collection of student data for ACT outcomes for student success. The outcome data is excellent and shows that ACT is a strength and a leading outcome set for the university. 86% of students met/exceeded gen ed benchmark (U bench is 70%) across outcomes, and 88% of students met/exceeded benchmark in program courses (we piloted assessment of two outcomes in program courses spanning yr1 to 5). 79% of coop employers rated critical thinking ability as very good or higher, with only 3% of employers rating the capacity as fair/poor. Students assessed ACT academic prep from 3.9 (CET/SOIS) to 4.25 (CAD) out of 5. The NSSE survey showed that 92% of seniors rank related confidence in critical thinking as 'Quite a bit' or higher. The data shows that critical thinking related skills are ranked highest by RIT seniors, actually higher than research, writing, speaking, and tech. Finally, our efforts in alumni ratings (AAS survey) show the highest rankings for critical (3.3/4) and creative and innovative thinking

(3.17/4), above quantitative reasoning (3.01/4). See Appendix 2 for a full report.

- Gen Ed Redesign: ACT is so much more than information evaluation, but also how information is organized, used, and built upon for innovation, and has pushed for 2 learning outcomes that reflect that, one in Gen Ed, and another, hopefully, in the program (because THAT is where creativity & innovation meet professionalism).
- Implementation & operation: As a university initiative, it is important to reflect both the evolution and strategic goals of RIT and the environment in which these efforts live. It is NOT a 'build it and they will come' model for cross-university, multi-stakeholder, inter- & intra-disciplinary goals at RIT. Success relies upon relationships, collaborations, and continuous strategic efforts.
- External partnerships: The THINKING peer university group grew to include other universities, and we hosted a virtual symposium (I am STEM) that attracted 60 participants (9/6/24) and a series of fall workshops, and submitted an NSF collaborative grant proposal, Inclusive Accessibility Movement (I AM) in STEM: Transformative Thinking in Action. (RIT portion \$81,628). Initiated meetings with the Golisano Institute for Business leaders for critical thinking curricula for their students.

Events

Events are an important visible mechanism to support engagement, both for the RIT community and for the wider community. We had 26 events with over 1400 participants.

| Date | Event Title | Registered Attendees |
|----------------------|--|----------------------|
| 9/6/24 | I AM STEM Inclusive Accessibility Movement in STEM: Transformative Thinking for Action Symposium Virtual Meeting, September 6, 2024 | 60 |
| 9/21/24 | GEM with Kerrie Holley | 80 |
| 9/23/24 - 9/24/24 | Signature Event - Poster Sessions | 150 |
| 9/23/24 | Panel Discussion on AI in Higher Education | 80 |
| 9/23/24 | Xtreme Theory CSCI-464 | 50 |
| 9/23/24 | AI's Impact on Career Paths: An Informal Conversation With Kerrie Holley | 42 |
| 9/24/24 | Dean's Breakfast | 4 |
| 9/24/24 | Interdisciplinary Research Methods-Engineering | 41 |
| 9/24/24 | AI in Society | 30 |
| 9/24/24 | PHT Faculty Group Meeting | 15 |
| 9/24/24 | Honors | 11 |
| 9/24/24 | Signature Event - Lecture & Reception | 650 |
| | Computer Science House | 15 |
| 9/23/25 | Signature Dinner | 19 |
| 9/24/24 | Signature Event - Virtual Lecture | 190 |
| 10/4/24 - 10/5/24 | Thought at Work Conf (Fram made a \$250 donation to this event) | 115 |
| 11/18/24 | Global Humanities Prep Workshop | 92 |
| 12/6/24 | Fullbright | 25 |
| 5/6/24 | Dubai PIL | 58 |
| 2/6/25 | Fram Spring Lecture Series part 1 | 68 |
| 4/6/25 | EDGE (Student Games Showcase) | 110 |
| 4/10/25 | Fram Spring Lecture Series part 2 | 66 |
| 4/24/25 | Creating Critical Thinking with High & Low Tech Tools: | 25 |
| 5/6/25 | Dubai Future Foresight Symposium | ? |
| 5/8/25 | A faculty MIND field integrating AI | 75 |
| | Total | 1421 |

Emerging issues: The efforts surrounding the emergence of AI continued. Dr. Schneider served as a member of the AI Taskforce subcommittee on Teaching and Learning and authored sections of the final report and guidance document. Multiple events focused on teaching and learning with AI. Clearly, the emergence of AI capacity for the masses will change how we provide and assess our capacity as a beacon of critical thinking education.

Management & Engagement

Communication Plan: Ten issues of the Fram Focus newsletter were published, with 8 Community of Practice members featured. These newsletters highlight upcoming Fram events, co-sponsored events, our Community of Practice, and feature relevant news and scholarly articles selected by Eugene H. Fram.

Social Media: Fram's social media account with X consisted of 106 posts and 1864 impressions.

Fram Related Service: Success for the Fram initiative means being a visible, engaging campus leader, particularly as it relates to the student learning experience. As part of her broad roles for the provost office, Dr. Schneider is a member of/ participates in the:

- Associate Deans meetings
- Student Success/ Operations Team
- Gen Ed Advisory
- Graduate Council
- Graduate Dean Advisory Committee
- RIT Graduate School Team (informally, through July 2024)
- RIT 365 Experience

2024 Fram Award at Imagine

These awards highlight student achievements in critical thinking for their critical thinking in the development of the exhibit. The annual awards are presented for both small-group and large-group categories. See Appendix 3 for award winners and abstracts.

Pedagogy, Teaching and Learning

Year One/365 course: Dr. Schneider continued her association with 365 as an experience presenter. Content related to ACT is integrated into the 365 curriculum, and students complete a baseline perception assessment of their ACT skillset. This supports our ability to develop measures to evaluate their ACT growth over their RIT time. The Fram Office is collecting data and will use the analysis to support continuous improvement.

RIT AI Taskforce: Since critical thinking is a key capacity integral to the implementation of AI, Dr. Schneider participated in the RIT task force to inform our strategy and continues to collaborate with the AI Hub director, Dr. Chris Collison.

RIT edX: The RIT edX course, Critical Thinking and Problem-Solving, launched in 2017 as part of the Soft Skills Professional Certificate program, which was retired in 2020. The course has been available through the Leadership Essentials Professional Certificate program since July 2020. RIT Certified is in the process of determining the strategy with edX.

RITx COURSES:

- **CRITICAL THINKING & PROBLEM SOLVING**

Total Enrollments: 10,434 (decreased)

Verified (Paid) Enrollments: 1,660 (decreased)

- **DESIGN THINKING FUNDAMENTALS**

Total Enrollments: 2,863 (decreased)

Verified (Paid) Enrollments: 409 (increased)

- **DESIGN THINKING: Empathizing to Understand the Problem**

Total Enrollments: 720 (decreased)

Verified (Paid) Enrollments: 158 (decreased)

- **DESIGN THINKING: Ideation, Iteration, and Communication**

Total Enrollments: 865 (decreased)

Verified (Paid) Enrollments: 142 (Increased)

- **DESIGN THINKING: Prototyping and User Testing**

Total Enrollments: 382 (decreased)

Verified (Paid) Enrollments: 77 (Increased)

Critical thinking for Graduate Education: As part of the effort to imbue applied critical thinking into graduate education, the Fram Chair sponsored Graduate Education Week on May 10, 2025. Dr. Schneider also supported the RIT Graduate School's GTA Foundations online course, which is required for all Graduate Teaching Assistants and includes critical thinking elements.

Individual faculty staff support for the development of ACT Teaching and Learning capacity: The faculty support model continues to grow as Dr. Schneider reviewed and shared practice advice for the teaching and learning of critical thinking. Group support/ workshops are included in events. Dr. Schneider provided about 20 individual mentoring and review sessions for faculty upon request, typically either framing the building of lessons and assessments or reviewing faculty drafts.

Practice and Assessment

Community of Practice & Exemplars: Our current Community of Practice (CoP) membership now includes 106 RIT faculty and staff members in the ongoing CoP, CoP of Teaching and Learning, CoP Disaster, and CoP AI. Some of these individuals retired or left RIT.

Assessment: There are more than 700 general education courses with confirmed ACT components and many program-level courses that support ACT@ RIT, by continuing to build our assessment strategy for ACT through these courses. Examples include:

| | |
|----------------------------------|--|
| The Ethnographic Imagination | Computational Thinking and Problem Solving |
| Ethics in the Graphic Memoir | Spatial Algorithms and Problem-Solving |
| Introduction to Language Science | Grand Challenges: Clean Water |
| World Building Workshop | Creative Critical Thinking and Problem Solving |

Student Learning Outcomes & Rubrics: (See Appendix 2). As noted above in major accomplishments, student learning outcome data collection and assessment were completed this year. [Assessment results for each outcome are available online](#). This year, collaborating with the assessment office, RIT Fram piloted the collection of problem-solving and innovation data in both Gen Ed and program courses, particularly in the capstone experience.

International Campus efforts: Each campus has engaged in applied critical thinking through its representative.

- **Rochester Institute of Technology – Kosovo:** The Fram Chair hosted an engaging and well-received workshop on the teaching and learning of ACT titled “All the Thinks You’ll Think” on February 10th, 2023, attended by 25 faculty members. Building on the momentum and positive feedback from that session, RIT Kosovo extended an invitation for a follow-up visit during her trip to Europe. The campus was especially pleased and honored that the Fram Chair was able to accommodate this engagement within her busy schedule, demonstrating her strong commitment to fostering innovative teaching practices and supporting faculty development. In April 2025, she returned to RIT Kosovo to deliver a second face-to-face workshop, this time focused on the integration of Artificial Intelligence and Critical Thinking in teaching practices. The seminar, titled “Creating Critical Thinking with High & Low Tech Tools: A Faculty MIND Field Integrating AI,” sparked dynamic discussions and showcased practical strategies for AI-enhanced instruction. There was a notably high level of enthusiasm and engagement among faculty, with many participants expressing a strong interest in further exploring how AI can support and transform pedagogical approaches. The workshop not only highlighted the relevance of AI in education but also initiated ongoing conversations about best practices, ethical considerations, and collaborative opportunities for implementing AI-driven tools to foster deeper critical thinking in students. Faculty feedback underscored a desire to continue these dialogues and expand institutional efforts to integrate AI meaningfully into teaching and learning.
- **Rochester Institute of Technology – Dubai:** Ethics and Philosophy minor officially offered by RIT Dubai (Fall 2024): first graduates with the distinction in the May 2025 Commencement ceremony. PHIL 415 – Ethical Theory Course offered for the first time (Fall 2024). AI Integration in Liberal Arts Curriculum Workshop by Maria Kadi: This workshop was designed to provide ideas on how to use AI platforms like ChatGPT and Perplexity to assist or improve in classroom activities as well as lesson and assessment design (Spring 2025). Research Poster Competition held by the UWRT Writing Faculty: RIT Dubai students created posters to visually display their work from research essays they authored (Spring 2025). Interclass Debate held by UWRT Writing Faculty: students engaged in a formal debate-style activity around the topic “Does a university degree still guarantee success?”

- **Rochester Institute of Technology – Croatia:** Rochester Institute of Technology – Croatia (2024-2025): Rit Croatia continued its push toward a greater integration of AI in our curriculum and pedagogy. For the first time, faculty members were asked in their annual evaluation to report on their experience with AI. They were also encouraged, in their plan of work for the next academic year, to describe their strategies for increasing the use of AI in their classes. Over the summer of 2025, the faculty and staff of RIT Croatia will have to attend a series of workshops on AI (about 12 hours) to be provided by an external consulting firm. The aim of these workshops is to provide a foundational understanding of AI and to explore how generative AI can support work in both academic and administrative environments.
- **Rochester Institute of Technology, China:** Through the Research Consortium (2024-2025), a student team comprising six students developed a problem-solving research project. The research was designed to study the development and implementation of an AI-powered STEM education platform that integrates AIGC; the research was tailored to meet the specific needs of students at various educational levels. The proposed platform will utilize advanced technologies, including machine learning, computer vision, and natural language processing, to deliver personalized learning experiences and enhance the overall effectiveness of STEM education.

Fram Badge & the Mind Field

- Working with the FEAB, our office continued development of a new experiential opportunity for professionals and students. Phase 1 of this effort is the creation of the Mind Field experiences, which are focused learning events that are run in a workshop fashion, focused on a particular question the group would like to critically examine in an active format using the ACT learning skills. These facilitated Mind Fields support participant learning in a safe and productive space and inculcate the ACT skill process while also addressing an issue or question in an applied format. While still in the pilot stage, Mind Fields have become a key component of teaching and learning of ACT. The goal is to support student success by building from Mind Fields into a full (recognition) certification (badge) for participation. It is our goal that every RIT grad is recognized by employers for their abilities in critical thinking. RIT is well on its way to implementing the full badge option, and this dovetails well with Gen ED redesign processes that are underway. RIT is rigorously moving toward that goal, recognizing that the application of critical thinking becomes even more important as a differentiator in the age of AI.

RIT Critical Thinking Certification

Initial Certification Track Ideas

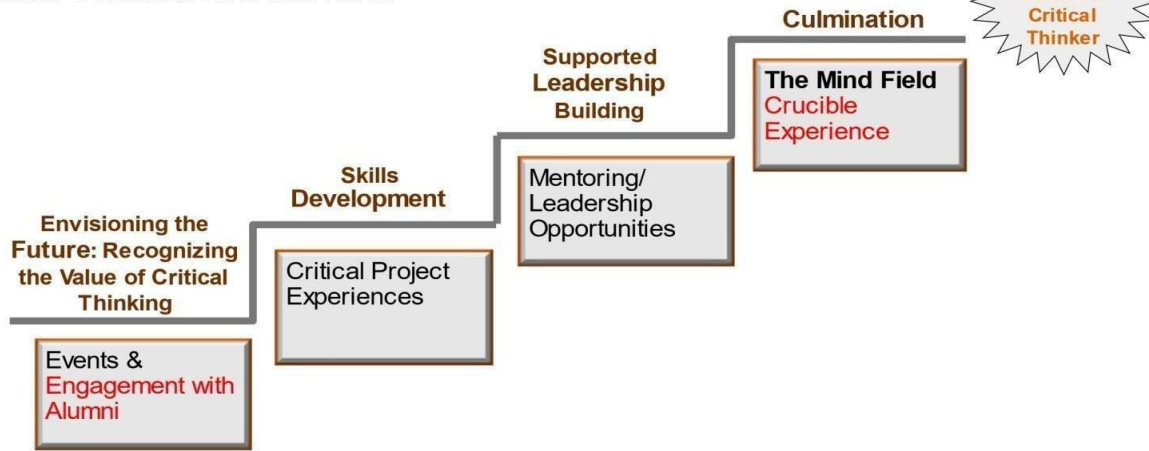


Figure 3: ACT Fram Badge

The Mind field and eventual Fram Badge is an exciting initiative in the Fram Portfolio. At its core, we plan a Badge will be earned upon completion of a process that includes: 1) engagement with alumni and attendance at events with speakers of significance; and 2) demonstrated development of ACT as part of project and team experiences and completion of a MIND field experience, centered around wrestling with a complex problem for which there is no clear answer nor path to follow, especially in a group inter-major or cultural capacity. MIND Fields are included in the event table in the Event section.

Scholarship

During this year, there were 702 scholarly artifacts. Of those artifacts, the faculty designated 157 (22%) artifacts as ACT. Examples include:

- Dera, Dimah, et al. "Trustworthy Uncertainty Propagation for Sequential Time-Series Analysis in RNNs." IEEE Transactions on Knowledge and Data Engineering 36. 2 (2024): 882 - 896. Web.
- Proano, Ruben, Publications / Journal Paper Bui, Hieu, et al. "An Analysis of COVID-19 Vaccine Hesitancy." IISE Transactions. (2024): --. Web.
- Bao, Amanda, Albert Petry, and James Warren. "Optimizing Steel Pile Design in Integral Abutment Bridges." Proceedings of the ASCE Geo-Structures 2024 Conference, November 17-20, Pittsburgh, Pennsylvania, USA. Ed. Geo-Structures 2024. Pittsburgh, PA, USA:

External Funding and Partnerships

Grant Proposal: During this academic year, Dr. Schneider submitted an NSF collaborative grant proposal with the Ohio State and the University of Florida, Inclusive Accessibility Movement (I AM) in STEM: Transformative Thinking in Action. (RIT portion \$81,628). Unfortunately, the proposal was not advanced.

External Engagement Efforts

RIT continued to engage externally in many efforts and has begun making strides in creating external partnerships and building its reputation over the past year, including:

- Continued a collaborative relationship with the University of South Florida – **A. Helene Robinson, Ed.D., Ed.S.** Director of Critical, Creative, & Design Thinking Program, Arts Integration Coordinator/[USFSM Incredi-Bull](#) Faculty Member, Department of Curriculum, Instruction & Learning/College of Education, to share assessment systems, policies, and strategy. In 2023, USFSM and RIT Fram drafted a conference proposal for NSF, titled “Proposal for a CCDT (Critical, Creative and Design Thinking) conference.” We have had feedback from the program officer and are in final preparation mode for submission when the opportunity reopens. RIT collaborated to host the IAMSTEM symposium for September 6, 2024, gathering 60 multi-university participants and adding to the THINKING peer group.
- **University partner support:** Provided materials to peer university partners upon request. Coming out of the pandemic, it has been extremely challenging for universities to advance teaching and learning initiatives and sharing and benchmarking of efforts is key to success. As a result, we began to share our methodology and tools with similar efforts.
- **Alumni Relations:** Alumni Relations continues to build programming and engagement opportunities for alumni that are relevant to their goals and create a relationship with the university. Alumni function as the Fram Executive Advisory Board and participate in Fram events. Working with Alumni Relations, Fram has also featured alumni as presenters at Fram events.
- **Mind Fields** (described in section Fram Badge and Mind Fields).

Integration with RIT’s Major Goals

Perhaps the most impactful efforts this year are the inclusion of AI and critical thinking, also known as driving authentic intelligence in the age of artificial intelligence. The importance of ACT in RIT’s long-term strategy is evident. Development of leaders within and at the intersection of technology, art, and design, especially as RIT aims to be a leader in artificial intelligence, requires fostering the thinking and experiences that prepare our community for this monumental technological shift. ACT is the LYNCHPIN of this integration and preparation.

Challenges to ACT Integration

The ACT at RIT initiative faces challenges that must be overcome collaboratively. RIT must continue to foster engagement of our own RIT community by establishing both top-down and bottom-up support and build connections at both the general education and program level, and through extracurricular activities outside degree programs. Advancing RIT’s reputation in the university community is of paramount importance. It is a simple truth that there are many

priorities and distractions on a college campus that make it difficult to emerge from the crowd of opportunities, particularly without a clear connection to the disciplines that attracted students to RIT. Further, the emergence of AI and its impacts on our professions and our lives cannot be understated. We must critically think through these changes and implementations to ensure that we meet this inflection point in society. The popular media, the integration of AI continues to paint a somewhat negative picture of college students' ability to think and focus beyond self. *RIT is proof that our students can and do practice wide critical thinking.* Further, learning and practicing critical thinking is difficult, takes time, and is resource-intensive for faculty, students, and classes, requiring significant commitment. ACT must be an expected *and* obvious part of each student's experience, so that the students see and understand their role in developing their own capabilities.

ACT Recommendations

Our efforts in ACT now give us the opportunity to make a significant impact both inside and outside of RIT. The processes, engagement, curricular structures, and best practices are now in place to allow our effort to mature and evolve. The Fram Chair is ultimately responsible for the leadership of the ACT initiative by creating community engagement and integration across the student experience. Our immediate goal is to increase faculty, staff, and student capacity to practice ACT by significantly enriching (or expanding) the student impact.

The opportunity to leverage our ACT@RIT initiative to advance RIT on many fronts is apparent. The academic year 2025-26 is focused on building student success across our campuses, faculty teaching and learning of critical thinking, and messaging and collaborating outside our campuses.

- **Continued focus on AI and critical thinking:** As AI permeates our programs and our society, it is important that students understand the balance of AI thinking with us or for us. The ACT effort at RIT is a key process to support university aims and student success, specifically for guiding both the technical capacity (use of AI in domains and generally) and for critical thinking about the role of AI in our professions and our lives.
- **Visibility, recognition and continuous improvement:** Guided by data, three Fram advisory boards and RIT leaders to advance ACT goals through events and faculty, student, and community engagement, especially as we assess our learning outcomes around AI. As the university's strategic framework comes into focus, the Fram Strategic Action Plan will be updated to reflect the university's aims. It is our goal that every RIT grad is recognized by employers for their abilities in critical thinking. RIT is rigorously moving toward that goal, recognizing that the application of critical thinking becomes even more important as a differentiator in the age of AI. As RIT continues to climb in university ranking, it is important that we build and showcase these important university efforts.
- **Student success:** Building on our strong results, we will focus on creating a deeper faculty MIND Field 'toolbox' training for both Rochester & international campuses, and continue to support the selected rollout of gen ed redesign across RIT.
- **Collaborations and scholarship:** Increase connections across university and external partner initiatives and educational experiences. Create a critical thinking and problem-solving training course for external audiences through RIT Certified. Create an employer version of a critical thinking introductory resource. Seek additional external funding opportunities and complete a publication related to the ecosystem of applied

critical thinking.

- **Complementary learning:** Leverage the applied critical thinking process for the growth of RIT Certified and other complementary ways of learning, such as Mind Fields, cross-campus opportunities, and collaborative programming (The SHED, 365, k12, etc.).

Conclusion

The Applied Critical Thinking initiative has the required components in place to achieve our goals of creating an environment that cultivates advanced critical thinking skills for RIT students and alumni and establishes national prominence and recognition for RIT. Fram/ACT will continue to cultivate an integrated and future-minded presence, particularly leveraging our capacity to meet our moment in the age of AI at RIT and beyond. This initiative is more important than ever to develop and support effective citizen-leaders who can successfully face the challenges of our evolving world and create a compelling future.

Appendix 1: History

The Eugene H. Fram Chair in Applied Critical Thinking was funded in 2011 by an anonymous RIT alumnus to honor Professor Eugene H. Fram. Gene Fram is a Professor Emeritus of Marketing who retired from RIT in 2008 after 51 years of teaching at Saunders College of Business. He is known for his expertise in the study of retail malls and shopping, Internet retailing, nonprofit and corporate governance, and advertising. Professor Fram received his Ed.D. in Higher Education from the State University of New York at Buffalo, his MS degree in retailing from the University of Pittsburgh and served as the J. Warren McClure Research Professor of Marketing at RIT. Gene is the recipient of the 1997 Eisenhart Award for Outstanding Teaching and the RIT Presidential Medallion in 2008.

Dr. Clarence Sheffield served as the inaugural Fram Chair from 2012 to 2015, and laid the foundation for the effort, including establishing the first faculty advisory board, writing of the *Critical Thinking across the Curriculum* report, adoption of general education student learning outcomes for critical thinking, engaging faculty and students through small group events and hosting of five speakers.

The effort was reorganized in 2015-16 with the appointment of Dr. Schneider, with the goal of impacting the student experience through faculty engagement and transparent communication. Since that time, major accomplishments have included the seating of three advisory boards comprised of Rochester faculty and staff, international campus faculty, and an external alumni advisory board; creation of two successive action plans that dovetail with university strategy; ongoing measurement and continuous improvement of student critical thinking through data gathering and analysis; implementation of a communication plan including the Fram Focus Newsletter, website, and social media; support of learning initiatives for faculty and students both on campus and through distance learning; and the establishment of the Fram Awards at RIT Imagine. In 2015-16, Dr. Schneider was also supported part-time by Dr. Evelyn Brister of COLA, Philosophy, who created a new course in 'Responsible Knowing'. Dr. Schneider initiated and continues the practice of disseminating an ACT annual report that summarizes efforts and accomplishments. This initiative expanded in 2016-17 with increasing engagement and integration of the effort on the Rochester campus.

External and internal engagement accomplishments include the establishment of the Fram External Advisory Board, a social media presence on Facebook and Twitter, a new student-directed introductory video, and a partnership with University News as part of an expanding external outreach effort. The internal curricular efforts include three applied critical thinking experimental courses, an updated information literacy rubric, and implementation of an argumentation rubric.

Significant campus engagement resulted from fourteen events, Fram signature and collaborative programming, and the beginnings of a faculty/ staff community of practice. In addition to the regular applied critical thinking programming at RIT, more than 600 participants actively engaged in specific Fram opportunities over the course of the academic year.

2017-18 saw a substantial increase in social media presence on both Facebook and Twitter, proposal of an Association of Independent Technological Universities (AITU) Applied Critical Thinking Summit with peer university administrators for 2019, publishing of papers related to the implementation and evaluation of applied critical thinking at RIT, and a critical thinking-centric proposal to the Misk-Gates Foundation. Internal efforts include the establishment of the International Fram advisory board (IFAB) that includes members from our international campus locations, the very first Provost's Learning Innovations Grants (PLIG) awards, and the creation of rubrics for ACT-related analysis and evaluation of creativity and innovation student learning outcomes. Thirteen Fram events and collaborative programming created significant campus engagement. The year-over-year participation increased 4%, with more than 850 participants actively engaged in specific Fram opportunities.

In 2018-19, the maturation and integration of the Applied Critical Thinking initiative at the Rochester Institute of Technology (ACT@RIT) continued under the leadership of Dr. Jennifer L. Schneider. Applied Critical Thinking at RIT is framed, functional, and ready to meet greater challenges. We have entered a new phase of ACT efforts on the national stage and are poised to deepen our efforts to fulfill university goals. We have increased on-campus participation 700% over the last 5 years. We hosted 12 college-focused Fram events, and an institute-wide spring lecture and fall signature event set that were very successful. The year-over-year participation increased 61% to an all-time high of over 1400 attendees despite the ongoing challenge of capturing interest on our busy campus. Engagement is more than event attendance, but a strategic refinement of university systems for student success. Notable accomplishments are measurable at all RIT campuses, including: implementation of the suite of rubrics for ACT-related student learning outcomes, and initiation of data informed ACT process evaluation; completion of a first-year student perception survey for Rochester that forms a baseline for longitudinal student assessment; establishment of a relationship for future RIT4LIFE opportunities; continued successful university-level offerings including the graduate 'Worldmaking' salon and a critical thinking course through RIT edX; growth in faculty support including resources, rubrics, teaching circle and workshop offerings; initiation of participation and feedback survey for RIT international campuses; and successful planning for the first of its kind Association of Independent Technological Universities (AITU) Applied Critical Thinking Summit, attracting participation for our peer institutions for a summit in August 2019.

In 2019-20, the maturation and integration of the Applied Critical Thinking initiative at the Rochester Institute of Technology (ACT@RIT) continued under the leadership of Dr. Jennifer L. Schneider. ACT@RIT is framed, functional, and ready to meet greater challenges. We have entered a new phase of ACT efforts on the national stage and are also poised to deepen our efforts to fulfill university goals. We have increased on-campus participation 700% over the last 5 years. This year, we hosted 24 cosponsored Fram events and an Institute-wide fall signature event that was very successful. The year-over-year participation increased 64.6% to an all-time high of nearly 2500 attendees despite the challenge of the COVID-19 Pandemic. The measure of our success is not limited to event attendance but is defined by our level of engagement and strategic refinement of university systems for student success. Notable accomplishments are measurable at all RIT campuses, including: successful AITU summit of peer universities in August 2019, development of unique webinar event series with Alumni Relations and several colleges related to the pandemic (capitalizing on the RIT4Life model), establishment of a unique Community of Practice Disasters that highlighted professors that contribute in this important

area, continued growth in faculty support including resources, rubrics, and workshop offerings, initiation of support and engagement of RIT international campus faculty.

In 2020-21, we hosted 18 cosponsored Fram events and an Institute-wide Spring speaker event that was successful. Nearly 1000 attended Fram events this year despite the ongoing challenge of the COVID-19 Pandemic. Temporary administrative support was provided by Linda Lagree, through Datrose, RIT's temporary staffing agency. Linda's temporary assignment ended June 30, 2021, and Ms. Tamaira Brown worked for the Fram chair from August 2021 to July 2022. Ms. Lagree was then rehired to support the chairship in the summer and fall of 2022. Jennifer DiLucia began working for the Fram Chair in December 2022.

In 2022-23, we hosted 15 events with in-person and virtual participants (1000 total) and expanded the ACT effort and reputation further through the implementation of internal and external partnerships with a broad group of collaborators, successful piloting and implementation of the unique internal and external (corporate) Mind Fields, and the integration of GTA training. This was a successful year despite the pandemic.

In 2023-24, we hosted 15 events, attracting nearly 1100 participants. As artificial intelligence continues to advance and integrate into our daily lives, we aim to understand how to embrace this technology effectively. To this end, we established a new Community of Practice (CoP) group comprising ten members, with plans to expand membership throughout the coming year. Since AI has already created a significant shift in our thinking, Dr Schneider was active on the AI Taskforce, particularly related to the teaching and learning of the impacts of AI. Efforts with all campuses increased and included both faculty training and individual support for curricula development. Working with the assessment office, the Fram office gathered ACT data for evaluation. This effort will continue into 2024-2025.

In 2024-25, we hosted 26 events, attracting over 1400 participants. As artificial intelligence continues to advance and integrate into our daily lives, we aim to understand how to effectively embrace this technology. Since AI has already created a significant shift in our thinking, Dr. Schneider was actively involved in the AI Taskforce, particularly in relation to teaching and learning of the impacts of AI. Efforts with all campuses increased and included both faculty training and individual support for curricula development. ACT outcomes for student success results were excellent and show that ACT is a strength and a leading outcome set for the university. 86% of students met/exceeded gen ed benchmark (U bench is 70%) across outcomes, and 88% of students met/exceeded benchmark in program courses (we piloted assessment of two outcomes in program courses spanning yr1 to 5). 79% of co-op employers rated critical thinking ability as very good or higher, with only 3% of employers rating the capacity as fair/poor. Ninety-two percent of seniors rank related confidence in critical thinking as 'Quite a bit' or higher. The data shows that critical thinking related skills are ranked highest by RIT seniors, actually higher than research, writing, speaking, and tech. Finally, our efforts in alumni ratings (AAS survey) show the highest rankings for critical (3.3/4) and creative and innovative thinking (3.17/4), above quantitative reasoning (3.01/4). RIT Fram partnered with the Ohio State, University of Florida to submit an NSF STEM proposal. The THINKING peer university group hosted a virtual symposium (I am STEM) that attracted 60 participants (9/6/24) and a series of fall workshops, and submitted an NSF collaborative grant proposal, Inclusive Accessibility Movement (I AM) in STEM: Transformative Thinking in Action. For this academic year,

faculty reported 702 scholarly artifacts. Of those artifacts, faculty designated 157 (22%) artifacts as ACT. The opportunity to leverage our ACT@RIT initiative to advance RIT on many fronts is apparent.

Appendix 2: Learning Outcomes

FALL 2024 GENERAL EDUCATION ASSESSMENT RESULTS: CRITICAL THINKING

Introduction: In AY 2023-2024, RIT assessed all four of the General Education Critical Thinking student learning outcomes. The fall 2023 assessment of *Analyze or construct arguments considering their premises, assumptions, contexts, and conclusions, and anticipating counterarguments and use relevant evidence gathered through accepted scholarly methods and properly acknowledge sources of information* were conducted in traditional general education courses. In the spring and fall 2024, the Office of EEA and the Eugene Fram Chair for Applied Critical Thinking at RIT collaborated on a pilot assessment to measure *Reach sound conclusions based on logical analysis of evidence and Demonstrate creative or innovative approaches to assignments or projects* outcomes across the RIT curriculum with a focus on culminating or capstone courses within the major or profession. The purpose of this was two-fold: to determine how well students are achieving these outcomes at the end of their undergraduate education and as a proof of concept for the assessment of general education learning outcomes within capstone and professional courses. Participating faculty piloted application of rubrics for *Reach sound conclusions* and *demonstrate creative or innovative approaches to assignments or projects* to capstone projects, papers, and portfolios. The results of this assessment are summarized below. To augment our findings, we also examined the results of indirect assessment including the National Survey of Student Engagement, the Co-op Evaluation, and the Alumni Attitude Survey.

Outcome: Reach sound conclusions based on logical analysis of evidence

Benchmark: 70% of students will achieve a rubric score of Competent (3) or higher

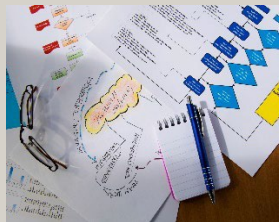
Course: MUSE 490, HYA 530, FTDN 122, FMCET/MECA/RMET 565, BIOL 575, PHYS 150, Multidisciplinary Senior Design 497

Number of Students: 408

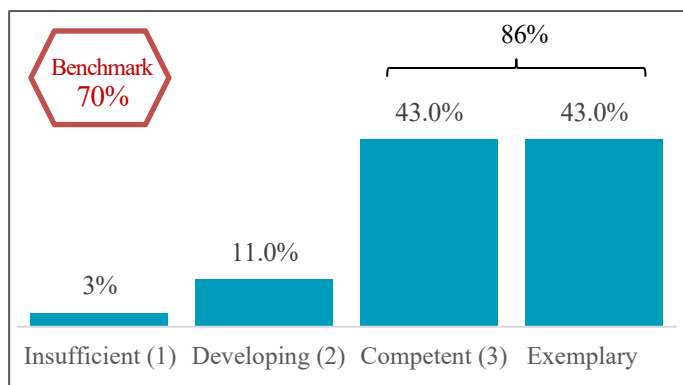
Key Findings:

- **Benchmark Met**
- 86% of students achieved a rubric score of Competent (3) or higher

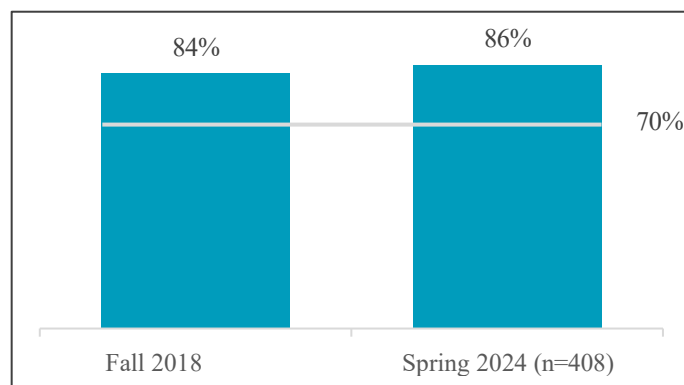
Next University Assessment: Spring 2028



Fall 2024 Results by Rubric Score



Fall 2024 Trend Results



Findings: The benchmark was met in this assessment with 86% of students scoring Competent (3) or higher on the rubric. Trend results show an increase in the percentage of students meeting the benchmark from the spring 2018 assessment results. Results were analyzed by rubric criteria, and students scored highest on *Analysis and Interpretation* criterion and the lowest on *Inquiry* (Table 1). Some faculty described how they will use the results to improve student learning in their course or program. Additionally, it was recommended that RIT provide students with a thorough introduction the library resources (Table 2).

Table 1: Results by Rubric Criteria

| Rubric Criteria | % Scoring Competent (3) or Higher |
|-----------------------------|-----------------------------------|
| Inquiry | 82% |
| Analysis and Interpretation | 94% |
| Conclusions | 88% |

Table 2: Use of Results and Recommendations (Summarized from Faculty Submission):

| Course level Findings and Action Items |
|--|
| <p>MUSE 490</p> <ul style="list-style-type: none"> Students who had brought more developed proposals and responded to faculty feedback on the proposal into the course (from its pre-requisite, MUSE 489) performed higher than those who had not done so. Thus, success in securing research resources impacts success in inquiry, analysis and interpretation, and conclusions. Similarly, students who had identified appropriate sources by the end of the previous course performed higher than those who had too many, too few, or less coherent literature reviews. Next steps are to share findings with program faculty <p>BIOL 575</p> <ul style="list-style-type: none"> Emphasize the conclusion components more next time as some students didn't follow their analysis to the conclusion and recommendation for action. The course co-taught with BIOL-675, so there are graduate students in the class as well, and I think their additional training in this area helps raise the overall performance (students are in mixed groups). The students who have been through ENVS-501/502 Capstone also already know how to do this kind of case study analysis. <p>FMCET/MECA/RMET 565</p> <ul style="list-style-type: none"> Develop students' communication skills necessary to demonstrate their capabilities on these three aspects of the design project. Reinforce teamwork and leadership skills as students had issues carrying their own weight and completing tasks in a timely fashion. |
| University and Program Recommendation |
| <ul style="list-style-type: none"> Provide first year students with a thorough orientation to the university library resources and scholarly expectations |

Course Spotlight, Engineering Technology Capstone FMCET/MECA/RMET 565: An example of a capstone project that requires students to reach sound conclusions based on logical analysis is summarized below.

“The course focuses on the design, production, and testing of a device to satisfy a broadly and ill-defined project. Students must start by fully defining the project from customer needs to the development of an engineering specifications document. They must then generate a series of possible solutions and evaluate those solutions against the engineering specifications. Finally, the product must be prototyped and tested. Throughout the project, students are going through design reviews, working as a team, and communicating using a variety of media. The project culminates with a formal presentation and report.”
(Dr. Beth Carle)

Outcome: Demonstrate creative or innovative approaches to assignments or projects



Benchmark: 70% of students will achieve a rubric score of Competent (3) or higher

Course: SOIS 510, BIOL 575, MCET/MECA/RMET 565, MUSE 490, PHYS 150, SOIS 510, FDTN 122

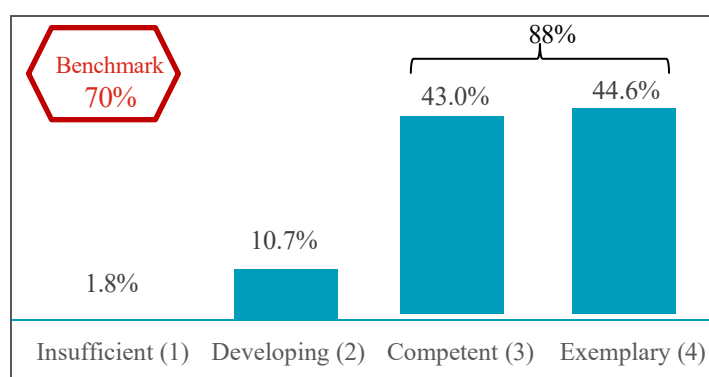
Number of Students: 323

Key Findings:

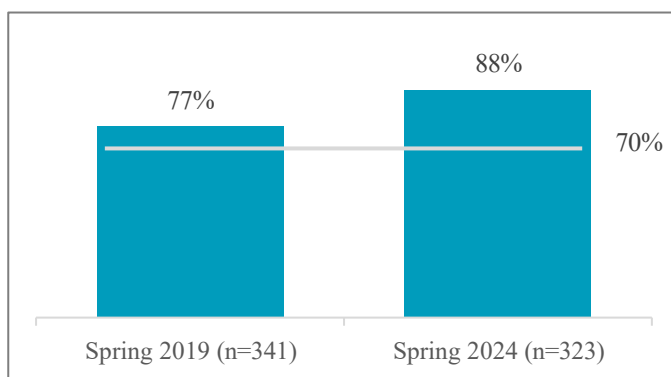
- **Benchmark Met**
- 88% of students achieved a rubric score of Competent (3) or higher

Next University Assessment: Spring 2028

Fall 2024 Results by Rubric Score



Fall 2024 Trend Results



Findings: The benchmark was met in this assessment with 88% of students receiving a score of Competent (3) or higher on the rubric. This is the second time this outcome has been assessed and the trend results show student scores have increased from the 2019 assessment. Results were analyzed by rubric criteria and students met the benchmark for all four of the criteria and scored the highest on *ideation* (Table 3). Some faculty described how they will use the results to improve student learning in their course or program (Table 4).

Table 3: Results by Rubric Criteria

| Rubric Criteria | % Scoring Competent (3) or Higher |
|-----------------|-----------------------------------|
| Ideation | 87% |
| Creation | 86% |
| Presentation | 90% |

Table 4: Use of Results and Recommendations (Summarized from Faculty Submissions):

| Course Level Findings and Action Items |
|--|
| MUSE 490 <ul style="list-style-type: none">• Success in ideation can have an impact on success in creation. Students who had a concrete research question brought into the course (from its pre-requisite, MUSE 489) performed higher than those who had a vague question. Similarly, students who had identified |

appropriate sources by the end of the previous course performed higher than those who had too many, too few, or less coherent literature reviews.

- Discuss with faculty and students if repository and examples are helpful and develop other aids for supporting student learning and achievement of this outcome.
- Provide better examples of literature review and research questions ONLY, not the full examples of thesis papers, to help guide students.
- Develop a repository of the parts of the research paper and presentation that cohere with the learning objective to "demonstrate creative or innovative approaches to assignments or project."

SOIS 510

- Distribute the scoring weight more evenly across ideation, creation, and presentation. This change will communicate to students the importance of the entire process, not just the end deliverable. The rubric is helpful as it highlights the importance of ideation, creation, and presentation. The capstone course includes each of these three components in a significant manner; however, the bulk of the grade weight over the years has been placed on the final presentation deliverables.

BIOL 575

- Examine the timing and the scaffolding of support for this assignment. Students are given 5 choices of formats (research paper, grant proposal, general audience article, information poster; or game) in January. As the class progresses, most change their minds and most of them don't give put in a lot of effort until the project is almost due in April. I used to have them turn in mandatory drafts to give them feedback, but I got a lot of poor, incomplete work that was impossible to grade. Now I tell them I will read and give feedback on as many drafts as they want and I rarely get anyone turning anything in early for feedback (3/18 asked for feedback this time). On the other hand, the work they turn in is mostly quite good, so maybe it's not broken? I also struggle with how much instruction to give them on writing – particularly grant writing - when few students choose that option.

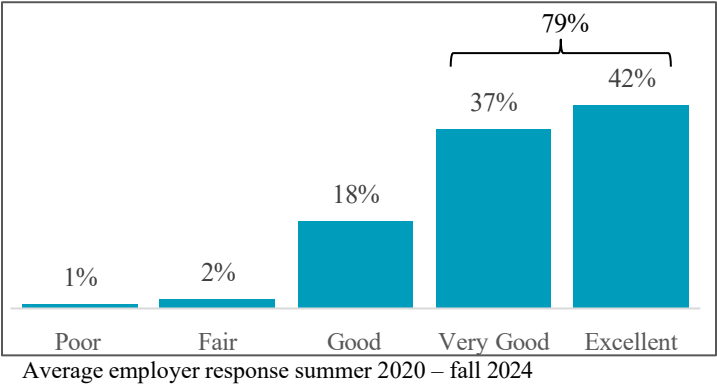
Course Spotlight, Museum Studies Capstone MUSE 490: An example of a capstone project that requires students to demonstrate creative or innovative approaches to assignments or projects is summarized below.

"For this Capstone, students identify an appropriate topic for a research-based or project-based thesis, select an appropriate methodology, evaluate literature, apply relevant terminology, and translate research into a format that can be developed into a paper and a shortened format poster presentation. Students present findings to the public including responding to questions from the public and engaging with individuals unfamiliar with the topic at hand." (Dr. Juilee Decker)

Critical Thinking Survey Data: National Survey of Student Engagement, Co-op Evaluation, and Alumni Attitude Survey

Methods: In addition to the course-embedded assessment of RIT’s GE SLOs, we examined student responses to critical thinking items on the National Survey of Student Engagement, student and employer responses to the Co-op Evaluation, and responses to the Alumni Attitudes Survey. By looking at data on critical thinking at RIT in a more holistic manner, we hope to gain some insights into student performance, student opportunity, and potential areas for future direction.

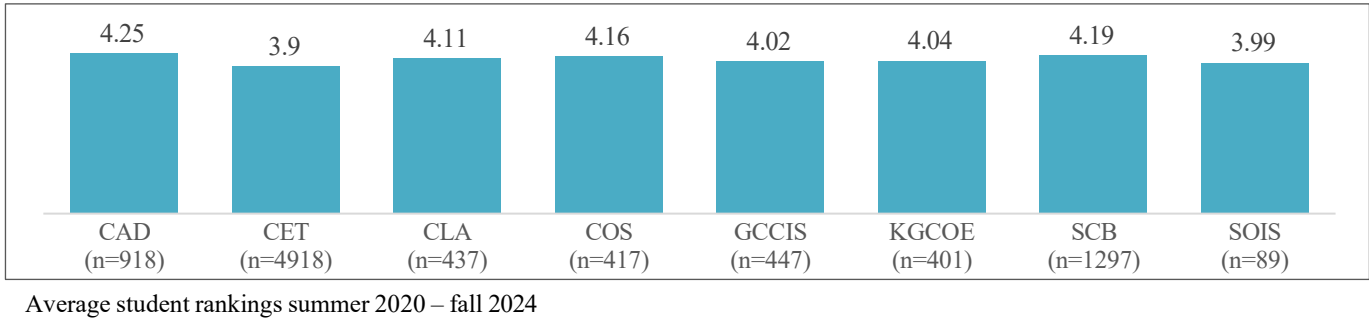
Critical Thinking Ability - Performance Ratings



Co-op Employer Evaluation Findings: A total of 79% of employers rank RIT students critical thinking ability as a Very Good Performance (4) or higher on a scale of Poor Performance (1) to Excellent Performance (5). Although the university does not have an established benchmark for this instrument, many programs use this ranking as a standard. A very small percentage (3%) of employers rank RIT students at either Fair Performance (2) or Poor Performance (1).

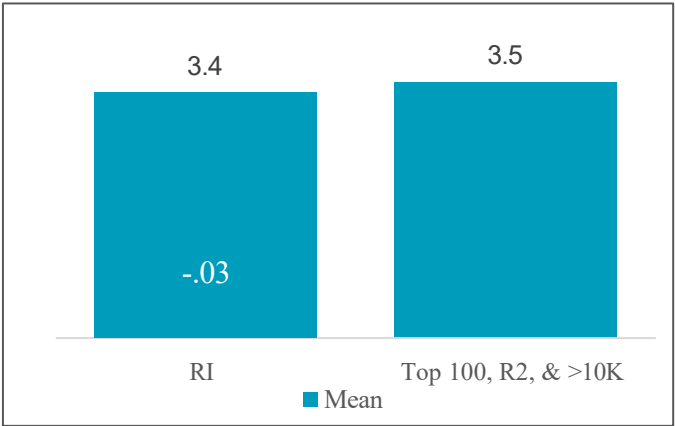
Co-op Student Evaluation Findings: RIT students across 118 majors and 11 colleges ranked their academic preparation on a scale of 1 (Poor) to 5 (Excellent) in applying their critical thinking skills during their co-op from summer 2020 to fall 2024. Each college averaged above a 3 (“Average”) and 80% of colleges averaged above a 4 out of 5.

Student Ranking of Academic Preparation

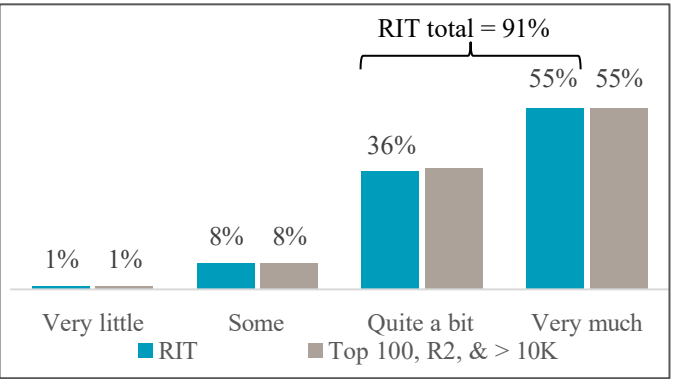
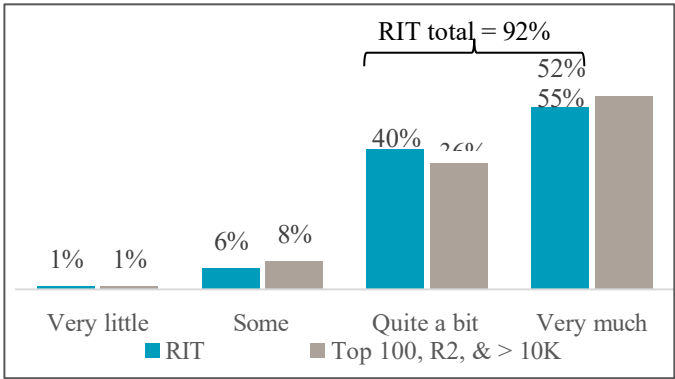
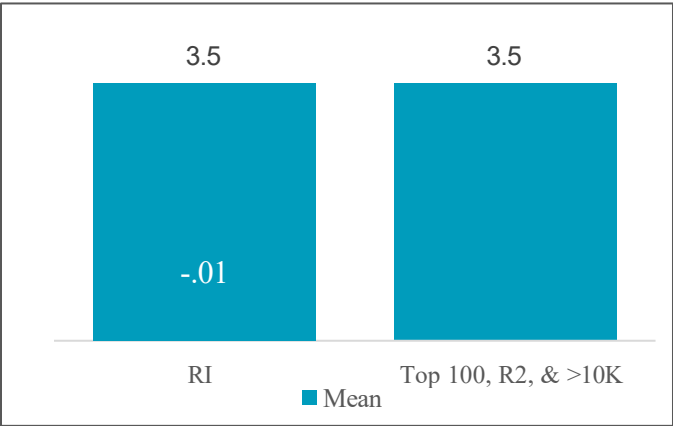


National Student Engagement Survey (NSSE), Senior Students: A total of 92% of RIT seniors rank their confidence in *critical thinking and analysis of argument and information* as Quite a Bit (3) or higher on a scale of *Very Little* (1) to *Very Much* (4), with an average student ranking of 3.4. Similarly, a total of 91% of RIT seniors rank their confidence in creative thinking and problem solving as Quite a Bit (3) or higher on a scale of *Very Little* (1) to *Very Much* (4), with an average student ranking of 3.5. RIT student rankings for these items are on par (not statistically significant, small effect size) with student rankings from comparable universities, (R2, US News Top 100 Universities). Importantly, critical thinking and related skills are ranked highest by RIT seniors; seniors rank these skills as higher than research, writing, persuasive speaking, and technological skills.

Critical Thinking and Analysis



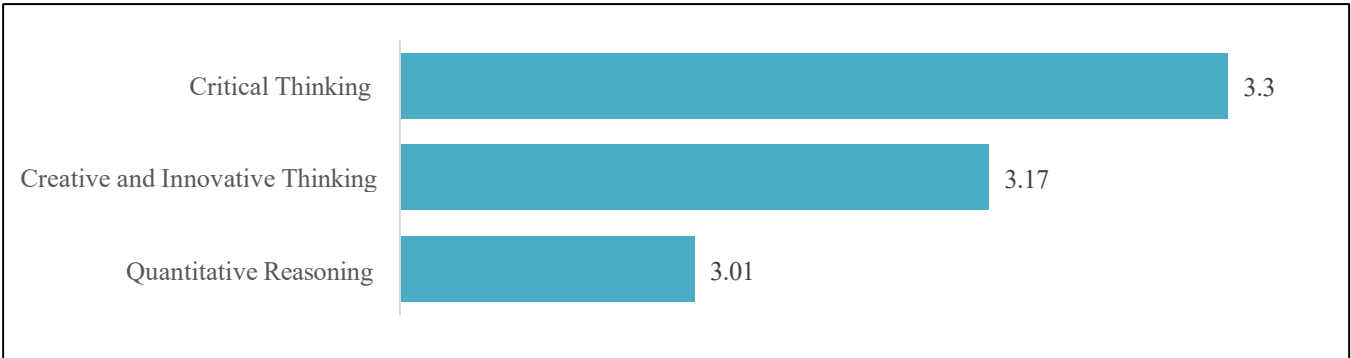
Creative Thinking and Problem Solving



Alumni Attitude Study (AAS): RIT alumni (graduated between 2016 and 2024) ranked RIT’s contribution to their critical thinking ability as a 3.3 on a scale of 1 (no contribution) to 4 (significant contribution).

Similar categories related to critical thinking rubric criteria were also ranked. The alumni ranked RIT’s contribution to their creative and innovative thinking as a 3.17 out of 4 and to their quantitative reasoning as a 3.01 out of 4. It is interesting to note that alumni rankings were highest for Critical Thinking and Creative and Innovative Thinking, showing that the high ratings for this skill set are retained by our alumni.

RIT Preparation of Alumni



Extent RIT prepared for success after graduation

Critical Thinking and General Education Reflections: RIT students met and exceeded the benchmarks for the critical thinking student learning outcomes *reach sound conclusions based on logical analysis of evidence* and *demonstrate creative and innovative approaches to assignments or projects* when assessed in professional courses and at the Capstone level. Further, after examining university data sources related to critical thinking skills, it is clear that RIT prepares students to be critical thinkers, innovators, and problem solvers. Employers rank RIT students as effective critical thinkers and alumni identify critical thinking and problem solving as a strength from their time here. While these findings do not imply that changes to curriculum and instruction are needed, it is important to note it is challenging to teach and assess problem solving, creation, and innovation solely in the general education curriculum. RIT places significant emphasis on this work in professional program experiences and these experiences are likely the best place to focus assessment efforts. Second, faculty, at all levels continue to share feedback that students need additional support with key skills such as identifying appropriate research questions, review and synthesis of sources, analysis and connection and engaging in the research or ideation process. Thus, we suggest that foundational critical thinking skills with problem solving skills are the building blocks to creation and innovation and should be the focus of the general education learning outcomes. The capstone or culminating experience is an effective measure of the student ability to *Reach sound conclusions based on logical analysis of evidence as a key component of problem solving. Then, assessment of Demonstrate creative or innovative approaches to assignments or projects assesses student ability to create new or innovative capacity as emergent professionals.*

Thank you to the RIT faculty members who participated in this critical thinking assessment!

Stephen Aldersley, Makini Beck, Beth Carle, Beth DeBartelo, Juilee Decker, Leonie Fernandes, Gina Ferrari, Joel Galegos Greenwich, Elizabeth Hane, Janice Shirely, David Wick, Ben Zwickl

For questions, support, or to submit completed plans, contact: Leah Bradley, Director of Educational Effectiveness Assessment, at lmdbfp@rit.edu.

Appendix 3: Fram Award for Excellence in Applied Critical Thinking at Imagine

Since applied critical thinking at RIT is an active process, awards are based upon the applicant's ability in their response to show evidence of the quality of the critical thinking process used to arrive at the final outcome of the exhibit. Responses are evaluated to the degree to which they demonstrate excellence in applied critical thinking. <https://www.rit.edu/criticalthinking/fram-chair-award>.

Fram Award for Excellence in Applied Critical Thinking at Imagine Aware winners are:

2025 Small Group Award Winner: Leveraging 3D Ceramic Printing for Personalized Bone Implants



Team: Leanna Frasch, Jillian Silva, Jade Myers, and Denis Cormier.

Abstract: This exhibit showcases the potential of novel ceramic 3D printing technologies in designing personalized implants. The process workflow begins with computer-aided design (CAD) and simulation, demonstrating how patient-specific data from scans can be translated into personalized designs using tools like 3D Slicer. Advanced software, including Fusion360 and nTop, further enables the creation of biomimetic structures. The exhibit will feature ceramic 3D printed materials at various stages—demonstrating the entire process, from pre-processing to post-processing, and highlighting the machines used and final products designed for patient-specific bone-cartilage scaffolding and implant research.

2025 Large Group Award Winner: RIT Iceberg



Team: Igor Polotai, Professor Jim Rankin, Elyana Medcalf, Michael Norton, Ava Curby, Daisy Roberson, Dannahe Kuntz, Dayne Stein, Evi Schwartz, William Walker, Alexa Amoriello, Andrew Steven Hernandez, Jay Miller, Connor Vallandigham, Emily Ott, Maya Smith, August Michaels, Samantha Beale, Hudson Ward, Christine Espeleta, Emmett Beggs

Abstract: The RIT Iceberg Exhibit seeks to exhibit, educate, explore, and engage visitors with RIT's vast student culture. It's built on the prior work of Igor Polotai, who cataloged over one hundred entries of RIT folklore, obscure history, and fun facts. This exhibit is an expansion of the original Iceberg, showcasing a curated selection of the origins of jokes, sayings, legends, pranks, stories, folklore, and material culture that shape the RIT student experience. The exhibit consists of a museum display of student-created objects, an interactive activity to add yourself to the folklore tapestry, and showcases the new Iceberg website.

The Fram Advisory Board also recognizes these teams as Honorable Mentions:

- Dual Charged Forced Induction Kit for Passenger Automobiles (P24654): Ryan Marino, Aly Troidl, Alex Schneider, Steven Miller, Zach Claus, and Jack Snyder.
- My Two Bodies: Zahra Babaei.
- All the Best - An Interactive Space for Words Left Unspoken: Shivika Chopra and Mentor - Prof. Jurica Dolic.
- AI-Driven Remote Heart Rate Estimation via Radar and Camera: Zheng Wu.
- Lunar Astronomical Motion Platform: Keila Kawash-Flewell, Ryland Charron, Michael Glynn, Kent Leighton, and David Becker.
- Kinetic Artwork and Interactive Computing: Anshul Kiyawat, Ashley Liew, Bertan Berker, Brian Williams, Caiden Williams, Dan Rigoglioso, Dory VanKlootwyk-Ford, Ethan Borys, Evelyn Zou, Hannah Hlotyak, Jacob Sakelarios, Jared Nobles, JD Rears, Joe Meyer, Kamron Cole, Kat Delaney, Lucas Cleary, Lucie Lim, Nate Appleby, Prajwal Manish Jaiswal, Pranav Sehgal, Robert Hochgraf, Ryan Baker, Sayantan Saha, Serena Akpoyibo, Sherman Zhou, Shivam Parashar, Vivek Senthil, and Zack Bamford. As well as the following faculty: Thomas Kinsman, Dennis Murphy, Garret Arcoraci, Ted Kinsman, and Tony Audi.



The history of the human community could be described as a history of conflict. Coming in different fashions, conflict has become rather the catchword for any form of encounter as it produces affirmative, dialectical mediation and transformative results. When we read the stories of remarkable people in history, we bask in the stories of conflict they overcame and the progress they made; we also see the recesses of their resilient dispositions. Among them is the transcendence of the community, rejection of chaos, anarchy, suffering, and organized interpretations of how to experience conflict. We must pause the temptation to abandon what confronts us as conflict, analyze it, and make it intelligible. Yet, it is reasonable to distinguish useful from un-useful conflicts, conflicts that are undermining existence and capitulating misery, cruelty, and imbricate with violence. It is also reasonable to recognize the need for resilience and resolution as counterpoints to conflict, and as a blueprint for transformative humanity. Likewise, we should raise questions about what it means to be heard or not heard as a person, a group, a people, a nation, and about who has the responsibility to speak for the other. The theme of the conference, “Conflict, Resilience, and Resolution: Transformative Humanity,” allows students to examine, as a human community, how we understand and respond to conflict, how conflicts manifest in our lives, and how we engage and transcend them.