Transforming COS…Transforming RIT

- Learning assistants
- Cross-campus STEM education research
- Research on learning
- Small group discussions on inclusiveness
- International collaborations of researchers
- College-wide discussions on equity
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The Center’s **Mission** is to:

improve science and math education and outreach initiatives at RIT and foster collaboration between science and math educators and education researchers.

The Center’s **Vision** is to:

- foster and grow a community engaged in rigorous, discipline-based STEM education research, providing infrastructure and opportunities for interdisciplinary communication and collaboration.
- support scholarship of pedagogy and teaching & learning, including transformational STEM educational practices.
- broaden participation in STEM through outreach, research and programmatic innovations.
RESEARCH INITIATIVES

Science & Mathematics Education Research Collaborative (SMERC)
Dr. Dina Newman (Director)
SMERC consists of a multidisciplinary group of Discipline Based Education Researchers (DBER), who study how students learn the STEM disciplines, apply science to problem solving, and become enculturated as scientists. This research advances fundamental knowledge of how people learn, and develops general theory that can be applied in practice. Individual projects include biology education, physics education, chemistry education, engineering education, and science/math communication. SMERC is the overarching team of researchers leading the following areas of research:

I. Photonics and Optics Workforce Education Research (POWER)
Drs. Ben Zwickl and Kelly Norris-Martin
POWER is a project led by Dr. Ben Zwickl. POWER unites higher education, discipline-based education research, and workforce development in order to investigate core aspects of typical undergraduate STEM programs: scientific content, mathematics, and communication. This project is funded through a National Science Foundation Education & Human Resources Core Research (ECR) grant DGE-1432578. In the Photonics Careers Project, the early careers of technicians, engineers, and researchers are being studied to better understand the transition from school to jobs. With perspectives drawn from employees and managers, PhD students and their supervisors, researchers are identifying key math, physics, technical and communication skills that are essential for success. This foundational research supports stronger bridges between school and work and between the industry advocates for workforce development and the academic communities focused on education research. The Photonics Careers Project will provide additional research-based clarity that informs national discussion and policy around STEM workforce preparation.

II. Molecular Biology Education Group (MBER)
Drs. Dina Newman and Kate Wright
MBER is a collaborative research lab co-led by Dr. Dina Newman and Dr. Kate Wright, faculty in the Gosnell School of Life Sciences at RIT. The team studies how students think about molecular biology concepts and develops tools for improving biology education. Areas of Interest include:

1. Student mental models of molecular processes that involve DNA, and how novices differ from experts. Much work has focused on student understanding of meiosis, which led to the development of a new framework, The DNA Triangle.

2. How visual representations of molecular processes impact student understanding. Prior work focused on the use of arrow symbols by experts and the interpretation of these symbols by learners. Current projects are examining how DNA is represented, on a continuum from the very concrete to the very abstract.
3. **How physical models can be used to improve student learning about molecular processes.** This work is done in collaboration with the Center for Biomolecular Modeling at the Milwaukee School of Engineering, where many 3-D models have been developed. These models provide the basis for activities that promote deep conceptual learning of processes that are not easy to observe directly.

4. **Development of assessments and activities for undergraduate instructors teaching molecular biology concepts.** Numerous activities have been developed based on research into student thinking of biology, many of which demonstrably improve learning for undergraduates at all levels. Research-based assessments are also developed to assess conceptual understanding.

5. **Interactive video vignettes for teaching key ideas that are difficult for students.** A suite of interactive, web-based activities have been developed to introduce or clarify key concepts and big ideas in biology. This project is funded by NSF (DUE-1432286, DUE-1432303) and involves a collaboration with Dr. Robert Teese (School of Physics and Astronomy at RIT) and Dr. Jean Cardinale (Alfred University).

III. Research Experience for Undergraduates (REU)

**Dr. Dina Newman and Dr. Kate Wright**

DBER REU is a program that brings students from all over the U.S. to learn about DBER and undertake cutting edge projects in the field (https://www.rit.edu/science/smerc/reu). SMERC members Kate Wright (PI) and Dina Newman (Co-PI) are leading the second iteration of the NSF funded REU program: **Research Experiences for Undergraduates in Model-based Reasoning in STEM Education at the Rochester Institute of Technology** (DUE 1757477). Spring/Summer 2019 the program enrolled 9 students from around the country:

- Carmen Carusone (The College of New Jersey)
- Aeowynn Coakley (San Jose State University)
- Paulina Cortez (San Diego State University)
- Grace Heath (Loyola University of New Orleans)
- Aimee Hernandez (University of Texas, El Paso)
- Ronald Quintero (Florida International University)
- Rebecca Ross (North Carolina State University)
- Kelli Shar (University of Tampa)
- Krystina Williamson (Barnard College)

IV. Graduate Admission and Retention Research

**Dr. Casey Miller**

The project focuses on holistic practices to increase diversity and retention in physics graduate programs. The team has studied current admission and retention across the United States, and offered targeted interventions and tools that aid programs in using more holistic measures. The goal of this project is to increase access to, and retention of, women and excluded identity groups in graduate physics programs.
1. Holistic Practice for Faculty. Short paper-based modules have been created to train groups of faculty on various holistic practices including the legal landscape of admissions, how to use GRE-scores, how to create a rubric for evaluation, how to identify non-cognitive qualities in graduate application and induction practices.

2. Non-Cognitive Assessment. Pilot testing is in progress to establish validity and reliability of this new instrument.

3. Interviews with faculty and students. The goal of these interviews is to determine faculty and student attitudes towards a variety of recruitment, admissions, and retention practices.

4. Presence of Homophily Within and Across Physics Departments. Comparisons of the educational backgrounds of physics faculty at academic departments shows a disproportional representation of faculty from elite institutions, particularly at the top ranked institutions themselves. This project is funded by NSF (NRT 1633275).

V. Franklin Physics Education Research Lab
   Dr. Scott V. Franklin

Dr. Scott Franklin supervises a variety of physics education research projects. Past and current projects include characterizing how physicists embed conceptual meaning in mathematical formalism, visualizing the different routes students take to graduation (academic field switching), studying the interaction of student identities with the physics culture, and developing and characterizing effective mechanisms for bringing about faculty and institutional transformation. Read More

VI. Inclusive Excellence Research
   Dr. Dina Newman, Dr. Scott V. Franklin

Under the HHMI Inclusive Excellence Initiative, research is being conducted on the motivation of faculty to participate in inclusion efforts, the incorporation of inclusive practices both in the classroom and in the lab, and on faculty’s perceptions and actual implementation of inclusive practices in the classroom. Read More. Two post-doctoral fellows are employed by the grant:

- Rita Margarida Almeida Quiñones de Magalhães
- Brittney Wyatt
RESEARCH ACTIVITIES

I. Interdisciplinary STEM Education Research Forum (ISERF)
https://www.rit.edu/castle/interdisciplinary-stem-ed-research-forum

In February of 2018, CASTLE, along with College of Engineering Technology formed an interdisciplinary collaboration forum. Under the direction of CASTLE faculty Dr. Dina Newman and Ben Zwickl, STEM education research groups across campus meet to present, share ideas, and further common research goals. Within little more than a year, this campus-wide scholarship community has grown focusing on removing silos of those researching STEM education scholarship. It has connected education research faculty, forming new partnerships, and encouraged working together on research themes and interests. In the 2018-19 academic year, associations grew to include:

- Golisano College of Computing & Information Sciences
- Kate Gleason College of Engineering
- College of Engineering Technology
- College of Health Sciences and Technology
- College of Liberal Arts
- National Technical Institute of the Deaf
- College of Science
- School of Individualized Study

2018-19 Forum Topics:
- Student Groups & Informal Learning Spaces
- Sharing Research Funding Ideas
- Sharing STEM Ed Research
- Focus on Computing

II. SMERC Journal Club
https://www.rit.edu/castle/research/journal-club

The RIT Science and Mathematics Education Research Collaborative (SMERC) runs a weekly journal club open to all, consulting with faculty interested in incorporating research-based methods and assessment into their classrooms. Twenty-two sessions were held in the AY2018. Run by Dr. Ben Zwickl, readings were selected by suggestion from a variety of publications led by rotating participant facilitation. Participants collaborated with the College of Engineering Technology (CET) who also holds a biweekly Journal Club on STEM Education Research.
III. Seminar Speaker Series
https://www.rit.edu/castle/research/seminar-speaker-series

This past year research faculty invited six guest seminar speakers from alternate colleges and universities to present to interested faculty, staff and students. Topics included research analysis, active learning, teaching practices, and cultural identity, to name a few. All were welcome to attend the seminars and workshops.

2018-19 Seminar Speakers

Jennifer Yates, University of South Alabama, September 5, 2018, 1pm-1:50pm
“Strategies for an Inclusive Classroom.”

Heather Lewandowski, University of Colorado-Boulder, November 14, 2018, 1pm – 1:50pm
“Engaging Students in Authentic Scientific Practices in Physics Lab Courses.

Martin Stein, Cornell University, January 22, 2019, 3:30-4:30 pm
“Measuring critical thinking during physics labs.”

Jason Wiles, Syracuse University, February 20, 2019, 1pm-1:50pm
“Explorations in Evolution Education and Equity and Inclusion in STEM.

Michelle Smith, Cornell University, March 22, 2019, 1pm – 1:50pm
“A Data-Driven Approach to Helping STEM Undergraduate Students During Key Transitions.”

Mary Brydon-Miller, University of Louisville, May 1, 2019, 1pm – 1:50pm

Mary Brydon-Miller, University of Louisville, May 1, 2019, 2pm – 3pm

Rebecca Lindell, Tiliadal STEM Education Solutions, June 5, 2019, 2pm – 3pm
“Solving the Gender Fairness Issue on the Force Concept Inventory: Understanding the Roles of Validity, Reliability and Fairness.”
Inclusive Excellence 5-Year Project
Funded by a $1M grant from Howard Hughes Medical Institute

The Inclusive Excellence 5-Year Project began in 2017 and has now completed two years of working toward a more inclusive environment across the College of Science. The program has directly involved 59 faculty, staff, and students in one or more cohorts in one of the three areas of focus: Research, Classroom Practice, or Community. Seventy additional faculty have attended at least one Inclusive Excellence event, ranging from reading groups and panel discussions, to award-winning films and internationally acclaimed speakers.

The initiative continues to work toward embracing perspectives, strengths and insights from individuals of varied backgrounds, lifestyles, economic statuses, nationalities and gender identifications. Year two engaged individuals from all Academic Units within the College of Science, building on the foundation begun by those in the natural sciences.

Campus-wide awareness of the efforts to create a more inclusive and welcoming environment for all students has increased through partnerships. Campus-wide and community events collaborating with the Office for Diversity and Inclusion’s Division of Diversity and Inclusion brought internationally acclaimed Jane Elliott to campus with a filled auditorium. With the aid of RIT Marketing Communication, several spotlights and feature stories have extended campus-wide and city-wide via television and print outlets.

Intersections, RIT podcasts was suggested to RIT University Communications, highlighting conversations between STEM faculty mentors and student mentees in the Inclusive Excellence program. It was so well accepted, that it is now used campus-wide where podcasts appear on the RIT website for all to experience.
Year three plans continue to address the many ways of creating an inclusive and welcoming environment for students in the STEM fields. Strategies are in place to:

- recruit new faculty to participate in classroom practice and research mentoring cohort experiences
- continue Diversity Theater workshops with actors improvisational enacting of participants’ personal stories.
- match and support additional pairs of faculty mentors and student mentees from a variety of underrepresented groups.
- embed faculty liaisons within academic units to reach more faculty and integrate the program’s ideals into the departments
- increase support from the Institute’s president and provost.
- track changes in perceived climate through faculty and staff surveys
- provide new engaging speakers, discussions, and other opportunities for the community to become educated about inclusivity issues
- partner with the Division for Diversity and Inclusion to develop a more supportive environment for students

This program is supported in part by a grant to RIT from the Howard Hughes Medical Institute through the Science Education Program.

Learning Assistant (LA) Program

Dedicated to the transformation of STEM courses – the LA Program creates environments in which students can interact with one another, engage in collaborative problem solving and articulate and defend their ideas. Undergraduate LAs facilitate small-group or other interactions in the classroom. RIT’s model is designed to: a) provide resources to help faculty implement pedagogical change in their classrooms, b) recruit and prepare talented STEM majors for teaching careers, c) engage faculty and departments in recruitment and preparation of future teachers and d) improve the quality of STEM education for all undergraduates.

During the Fall 2019 semester the program had 42 Learning Assistants working with 20 Faculty Mentors in four College of Science departments (Biological Sciences, Chemistry, Mathematics/Statistics and Physics) and two College of Engineering Technology departments (Manufacturing & Mechanical Engineering Technology, Electrical Engineering Technology). The American Sign Language and Interpreting Education department within NTID (National Institute for the Deaf) continued in 2018-19.

For the Spring semester there were 36 Learning Assistants working with 27 Faculty mentors within the same departments. Four Learning Assistants were placed in interpreting courses
mentored by NTID faculty (Interpreting II, Sign, Mime & Visual Theater, Intro. to Performing Arts and Women and the Deaf Community).

Two recruitment fairs were held (fall and spring semesters) to educate students on the Learning Assistant Program and provide them an opportunity to speak with past and current LAs about their experiences. The LA Program also hosted a teacher roundtable, bringing teachers from local schools on campus to speak with students interested in the teaching career path.

Summer Math Applications in Science with Hands-On (SMASH) Experience for Girls
The SMASH Experience for Girls is a summer program designed to increase middle-school girls’ engagement and interest in STEM. In the summer of 2018 this unique program brought 39 rising eighth grade girls to RIT’s campus from 13 different schools. Forty-nine percent of the participants were awarded need-based scholarships, the first year to come this close to the 50% goal. Participants spent a week working on mathematical modeling projects, designed to show the usefulness of mathematics in everyday life; self-affirmation activities created to build confidence in math; and daily recreational activities. This year the participants were hired by the Center for Disease Control and Prevention to look at an outbreak of bacteria contaminating our food. They were to develop a strategy to neutralize it.

The experience concluded with a hands-on event involving representatives from local companies demonstrating the role of STEM in their industries, and a parent symposium where participants present a problem plaguing their local community and how mathematics could be used to solve this problem. In preparation for the summer experience, RIT undergraduate and graduate students, with interests in K-12 STEM education, under the mentorship of a local teacher create, test, and then facilitate all SMASH activities.

Professional-development for Emerging Education Researchers (PEER)
This discipline-based education research program holds the promise of satisfying expectations of both scholarship, which is increasing at teaching-centric institutions, and teaching effectiveness, a concern at all institutions. Additionally, junior education researchers seek more diverse training in research methods and theories. Emerging education researchers need support as they develop their research programs and expand their theoretical and methodological expertise, and they benefit from the guidance of knowledgeable peers and near-peers.

In 2018-19 the PEER program expanded it’s international presence and now has a location in Vancouver, British Columbia, bringing the program now to five countries. This past year alone PEER held workshops in Rwanda, Cologne and Vancouver, and will, again hold a summer program at RIT. Participants include junior faculty, postdoctoral researchers and graduate students beginning their careers, as well as senior faculty looking to transition from traditional disciplinary research into STEM education research.

PEER-Rochester available projects include looking at the following questions:
- How do students collaborate within and among lab groups, and how does the nature of that collaboration change over the course of the summer experience? Network analysis is used to track collaboration within and among lab groups of 3-4 students.
• How do gender and ethnicity affect conversational equity in lab groups? Work is done in developing both quantitative and qualitative measures of equity, and comparing the measures among multiple groups.
• When former IMPRESS students return as learning assistants, how do their experiences in the program shape their interactions with students later on? The focus is on how learning assistant interactions with IMPRESS students change (or remain the same) as they move from participants to instructors.
• How does participation in the program affect student views of the nature of science and the role of experimentation? When students conduct experiments, researchers learn about ideas around what makes an experiment "good,” and how table-top experiments are related to scientific practices.

**PEER World Locations**
Rochester, NY, USA
Cologne, Germany
Kibungo, Rwanda
Monterrey, Mexico
Vancouver, BC
CASTLE CORE MEMBERS – Managing CASTLE Programs & Projects

Scott Franklin
Director, CASTLE and
Professor, School of
Physics and Astronomy

Dina Newman
Director, SMERC and
Associate Professor, Thomas H. Gosnell School of Life Sciences

Rita Margarita Almeida Magalhães
Postdoctoral Researcher
RIT Inclusive Excellence Center for Advancing STEM Teaching, Learning & Evaluation

Jennifer Bailey
Senior Lecturer,
Kate Gleason College of Engineering

Lindsay Owens
Postdoctoral Researcher
School of Chemistry and Material Sciences

Kelly Norris Martin
Assistant Professor, School of Communication

Susan Rothwell
Postdoctoral Researcher, School of Physics and Astronomy

Leslie Kate Wright
Associate Professor, Thomas H. Gosnell School of Life Sciences

Brittney Wyatt
Postdoctoral Researcher
RIT Inclusive Excellence Center for Advancing STEM Teaching, Learning & Evaluation

Benjamin Zwickl
Assistant Professor, School of Physics and Astronomy
RESEARCH FUNDING

Annual External Research Expenditures

External Research Expenditures (in thousands)

During the 2018 – 2019 academic year CASTLE has led or collaborated on 24 different grants that total more than $8.0 million.

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<th>Total Funding</th>
<th>Funding Details</th>
<th>Personnel</th>
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<tr>
<td>6/2013-8/2019</td>
<td>$899,907</td>
<td>Metacognition: A Transformative Approach to Retaining Deaf/HoH and first generation STEM Majors; NSF- National Science Foundation</td>
<td>PI Scott Franklin, Co-PI Elizabeth Hane</td>
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<td>7/2013-6/2017</td>
<td>$199,980</td>
<td>Collaborative Research: Transforming the Organic Chemistry Experience: Development, Implementation and Evaluation of Studio-Based Modules; NSF-National Science Foundation</td>
<td>PI Christina Goudreau, Co-PI Thomas Kim</td>
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<td>9/2014-8/2018</td>
<td>$399,309</td>
<td>Transfer of Math, Physics, and Communication Skills Into the Entry-level Photonics Workforce; NSF-National Science Foundation</td>
<td>PI Benjamin Zwickl, Co-PI Kelly Norris Martin</td>
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<td>9/2014-8/2018</td>
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<td>Collaborative Research: Development and Assessment of Interactive Video Vignette Modules for Biology Teaching; NSF-National Science Foundation</td>
<td>PI Robert Teese, Co-PIs Leslie Kate Wright and Dina Newman</td>
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<td>10/2014-9/2018</td>
<td>$339,825</td>
<td>REU Site: Model-Based Reasoning and Representations in STEM Learning at the Rochester Institute of Technology; NSF- National Science Foundation</td>
<td>PI Leslie Kate Wright, Co-PI Dina Newman</td>
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<td>5/2015-4/2020</td>
<td>$615,969</td>
<td>CPS: Frontier: Collaborative Research: Compositional, Approximate, and Quantitative reasoning for Medical Cyber-Physical Systems</td>
<td>PI Elizabeth Cherry</td>
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<td>6/2015-6/2018</td>
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<td>Collaborative Research: Role of Undergraduate Biochemistry Education in Protein Function Assignment; NSF-National Science Foundation</td>
<td>PI Paul Craig, Co-PI Herbert Bernstein</td>
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<td>PI/Co-PIs</td>
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<td>9/2016-8/2019</td>
<td>$299,982</td>
<td>Collaborative Transformation through Faculty Triads; NSF-National Science Foundation</td>
<td>PI Scott Franklin, Co- PI Sophia Maggelakis</td>
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<td>Collaborative Research: The PIPELINE Network; NSF-National Science Foundation</td>
<td>PI Linda Barton, Co-PI Ben Zwickl</td>
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<td>1/2017-4/18</td>
<td>$99,680</td>
<td>Integrated Photonics Workforce Needs Assessment for New York State; DOD – Department of Defense</td>
<td>PI Ben Zwickl, Co-PIs Anne Leak, Kelly Martin</td>
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<td>7/2017-6/2020</td>
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<td>Collaborative Research: Data Integration in Undergraduate Mathematics Education; NSF-National Science Foundation</td>
<td>PI Paul Wenger, Co-PIs Matthew Hoffman, Carl Lutzer</td>
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<td>9/2017-8/2022</td>
<td>$1,000,000</td>
<td>HHMI USE Inclusive Excellence 2017; HHMI-Howard Hughes Medical Institute</td>
<td>Scott Franklin, Co-PIs Jennifer Connelly, Elizabeth Hane, Lea Michel, Dina Newman</td>
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<td>9/2017-8/2020</td>
<td>$97,372</td>
<td>Collaborative Research: Using protein function prediction to promote hypothesis-driven thinking in undergraduate biochemistry education; NSF-National Science Foundation</td>
<td>Paul Craig, Co-PIs Herbert Bernstein, Jeffery Mills, Suzanne O’Handley</td>
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<td>8/2018-7/2021</td>
<td>$234,989</td>
<td>Collaborative Research: Developing a quantitative three-dimensional understanding of cardiac arrhythmias</td>
<td>Elizabeth Cherry, Co-PI Matthew Hoffman</td>
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<td>9/2018-8/2021</td>
<td>$134,491</td>
<td>Collaborative Research: Expanding Access: Furthering a network of diversity-focused programs in the physical sciences</td>
<td>Scott Franklin</td>
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<td>$115,714</td>
<td>Collaborative Research: NSF Includes Alliance Graduate Education Network</td>
<td>Casey Miller</td>
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<td>2/2019-1/2024</td>
<td>$524,692</td>
<td>CAREER: A computational approach to the study of behavior and social interaction</td>
<td>Ben Zwickl</td>
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<td>9/2019 – 8/2022</td>
<td>$499,795</td>
<td>Testing Predictions of Institutional Change Theories for Programs Focused on Improving Inclusion - NSF</td>
<td>PI Scott Franklin</td>
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<td>9/2019 – 8/2024</td>
<td>$238,334</td>
<td>Collaborative Research: The PIPELINE Community: Fostering the Growth of a Networked Improvement Community for Physics Innovation and Entrepreneurship Education – APS; NSF</td>
<td>PI Ben Zwickl</td>
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1. The 6th Annual CASTLE Symposium

The 6th annual CASTLE Symposium was held on Wednesday, May 8, 2019 in the Center for Integrated Manufacturing Studies (CIMS Conference Room). The symposium began with a poster session that showcased more than 20 student and faculty research projects focused on improving STEM education. More than 50 people attended to celebrate together the research being done in STEM education by faculty and students. College of Science Dean Sophia Maggelakis and Provost Ellen Granberg provided opening remarks. An award ceremony followed honoring recipients of the 5th “Science and Math Education Research Special Honor Award” and recognition of the 2018 – 2019 academic year Undergraduate Learning Assistants, Learning Assistant Mentors and Inclusive Excellent cohort members.

2019 Science and Math Education Research Special Honor Award Recipients:
- Sam Cammarata 4th year student, IMPRESS, Learning Assistant
- Stacey Davis NTID Science and Mathematics Support Coordinator
- Mike Eastman Associate Dean, College of Engineering Technology
- Debra Jacobson CASTLE Marketing Specialist

2018 – 2019 Undergraduate Learning Assistants:

2018 – 2019 Learning Assistant Mentors:
2. **Learning Assistant Program Fall/Spring Recruitment Fairs**
   The LA Program hosted two recruitment fairs, one in the Fall semester (October 19) and one in the Spring semester (March 22), which were great opportunities for interested students. The recruitment fairs started with a presentation by the Program Director, Scott Franklin, providing more details on the program, including expectations and commitments. After the Q & A session a student panel of current learning assistants spoke about their experiences and the benefits of the program. Students were then encouraged to visit with a faculty mentor from the department for which they are interested in being an LA.
The CASTLE Center had 18 publications by core CASTLE members.
Bold = core CASTLE member, * = undergraduate student


PRESENTATIONS

The CASTLE Center had 48 presentations by core CASTLE members.


Cervantes, A*, & Martin, KN (October, 2018). Some People Are Just Naturally Good at That: Values and Beliefs towards Communication in Photonics and Optics. McNair Conference at the University of Maryland-College Park.


Magalhães RM, Wyatt, BN, Newman DL, Franklin SV (June, 2019). We Talk the Talk, but Do We Walk the Walk? What Factors Keep Faculty from Implementing Inclusive Teaching and What are the Keys to Success? Gordon Research Seminar & Conference, Bates College, Lewiston, ME.


**Owens L, Mekker J*, Zwickl B, Franklin S, Miller C** (July, 2019). “Implications for Graduate Student Advising Based on Faculty Hiring Data.” Presented as an oral presentation at the AAPT International Conference hosted by the American Association of Physics Teachers, Provo, UT.

**Owens L, Zwickl B, Franklin S, Miller C** (July, 2019). “Role of Elite Universities in Improving Diversity Among Physics Faculty. Presented as an oral presentation at the PERC Conference, Provo, UT.


Shar K*, Zwickl BM, Miller CW, Owens L (August, 2019). Student and Faculty Perspectives of Retention in Physics Graduate Programs. Oral presentation at the RIT Undergraduate Research Symposium, Rochester, NY.


Zwickl B (December, 2018). Physics education for career preparation: Lessons from optics and photonics, Physics Colloquium at Kansas State University, Manhattan, KS.


STUDENTS MENTORED

The SMERC group plays a large role in mentoring Rochester Institute of Technology undergraduate students, as well as undergraduate students from other universities, to support experiential learning. SMERC members’ consistent involvement with student-centered research aligns with RIT’s strategic plan of becoming a student-centered research university.

Dina Newman and Kate Wright (Co-mentors)
Grace Elizabeth Dy (REU 2018, University of Washington)
Anna Neuenschwander (medical illustration)
Hannah Spector (1st year biotech)
Julia Steele (1st year biotech)
Lauren Trumppore (2nd year biotech, COS SURF 2019)
Tony Wen (1st year biotech)
Emalee Wrightstone (2nd year biotech)
Aeowynn Coakley (REU 2019, San Jose State U)
Paulina Cortez (REU 2019, San Diego State U)
Aimee Hernandez (REU 2019, U Texas El Paso)

Scott Franklin
Manuel Gomez-Bera (3rd year Physics)
Grace Heath (REU 2019, Loyola University New Orleans)

Ben Zwickl
Christopher Webster (RIT, physics)
Vina Macias (RIT, physics)
Jacob Poirier (RIT, physics)
Jessica Hathaway (REU 2018, East Carolina State University)
Latrell Powell (RIT, physics)
Krystina Williamson (REU 2019, Barnard College)
Carmen Carusone (REU 2019, The College of New Jersey)

Lindsay Owens
Jacob Makker (RIT, physics)
Kelli Shar (REU 2019, University of Tampa)

Sue Rothwell
Jacob Poirier, Undergraduate Research Assistant (3rd year Physics/Math minor)
Vina Macias, Undergraduate Research Assistant (3rd year Physics)

Kelly Martin
Alexandria Cervantes (REU 2018, University of California Monterey Bay)
Rebecca Ross, (REU 2019, North Carolina State University)
Grace Osytek (RIT School of Communication)
Kaleb Kronimus (RIT School of Communication)
Jes Nelson (RIT School of Communication)
Jessica Oates (RIT School of Communication)
NOTABLE ACHIEVEMENTS

Dina Newman
2019  Senior Editor for CourseSource
2019  Nominated for RIT Eisenhart Award for Outstanding Teaching Award
2018-2019  College of Science Distinguished Scholarship Award
2018-2019  College of Science Faculty Leader for Diversity and Inclusion
2018  Nominated for Isaac L. Jordan, Sr. Faculty Pluralism Award

Kelly Martin

Ben Zwickl

Rita Margarida Almeida Magalhães
2018-19  Gordon Research Conference Travel Award ($1,500)
The CASTLE site serves as a home-base for all CASTLE-affiliated programs, research and initiatives. 
https://www.rit.edu/castle/

Additional pages were added for a cross-campus Interdisciplinary STEM Education Research Forum. 
https://www.rit.edu/castle/interdisciplinary-stem-ed-research-forum

The CASTLE Inclusive Excellence Initiative was chosen as one of the four main highlights on the College of Science new website homepage. 
https://www.rit.edu/science/immerse-yourself/inclusive-excellence
In The News

Inclusive Excellence Cultivates Diversity (August, 2018) Research Fellowship Summer Program

DDI Newsletter Playback Theatre Story – by Debra Jacobson Read entire story…
Listen to Audio Blog of Faculty Mentor and Summer Student Fellowship
RIT Intersections audio blog on their conversation

Ricardo Carrion
Mentor: Dr. Hans Schmittgenner
Major: Chemistry, 2nd Year
Home: Rochester, NY
Research: Detecting Prostate Cancer Through Synthesizing and Targeting Multi-Model Imaging Agents

Ricardo is an RIT Destler/Johnson Rochester City Scholar, and he wants to make a difference in other’s lives who may have similar experiences growing up a minority with hardships. He hopes to go into politics, combining his scientific research and studies so as to offer educated options and perspectives pertaining to the health field and sustainability of the environment. With his mentor’s guidance, he is creating peptide-based targeted molecular imaging agents (TMIs) useful for diagnosing and monitoring cancer, heart disease, or other diseases.

Inclusiveness: Expressing science through art
https://www.rit.edu/news/student-spotlight-showing-artistic-side-science

Student Spotlight: Showing the artistic side of science
Dekline Carrion, first-year biotechnology and molecular bioscience student
September, 2018 - RIT Spotlight

CASTLE hosts summer program to advance research methods

Scott Franklin, professor in the School of Physics and Astronomy, and faculty associates Eleanor Sayre (Kansas State University) and Mary Bridget Kudisch (DePaul University) ran a two-week summer program through the Center for Advancing STEM Teaching Learning and Evaluation (CASTLE) titled “Professional-development for Emerging Education Researchers (PEER)” on the RIT campus. Participants were from University of Rwanda, Georgia Southern University, University of Florida, University of Utah, NYU Abu Dhabi, University of Regina, Illinois State University and RIT. The goal of the conference was to develop a diverse research network who will continue to collaborate about research methods and theories via bi-weekly video conferences throughout the year.

October, 2018- RIT - Spotlight

Inclusive Excellence hosts Forum on Inclusion & Diversity

On October 24, the Inclusive Excellence group hosted a forum to discuss the results of their survey examining faculty perspectives about inclusion in the College of Science. You can see the survey questions here: https://bit.ly/2DdLIC. Results will be shared at a later date.
Staff win Dean's professional development awards

Two College of Science staff members have been awarded funds to enhance professional development. **Narayan Wong**, research technician, GSoLS will receive funding to attend a two week Statistical Methods course at Cold Spring Harbor to build proficiency in computational analysis tools specific to Next Generation Sequencing. **Stephanie Livingston-Heywood**, staff assistant, CASTLE:Inclusive Excellence will receive funding to develop an ASL course for all CCS faculty and staff to enhance the ability to understand and communicate with deaf and hard of hearing persons.

CASTLE hosts STEM Ed research forum

On October 30, the Center for Advancing STEM Teaching, Learning, and Evaluation hosted an interdisciplinary research forum on research in STEM education during which presenters shared ideas for funding research in this field. GSoLS professor, **Dina Newman** presented a talk on “Web Tools and Analysis of Assessment Data for Biology Education Research” and Life Sciences visiting assistant professor, **Katllyn Stack-Whitney** presented "Knowledge Flows: virtual water as a case for understanding prizes' impact on STEM." The workshop also included small group discussions and feedback development of new collaborations.
November, 2018 – RIT University News

Inclusive Excellence hosts anti-racism activist
Internationally acclaimed anti-racism activist, feminist, and educator Jane Elliott was the invited speaker for November’s Inclusive Excellence event. Webb Auditorium was filled to capacity for Elliott’s talk, titled “Power, Perception and Prejudice,” held November 6.

December, 2018 – RIT University News

How metacognition supports classroom inclusion
On December 5, Inclusive Excellence faculty members, Elizabeth Hane, associate professor, GSoLS and Scott Franklin, professor, SoPA led a panel discussion of IMPRESS students about their experiences of learning after taking a metacognition class. The discussion focused on techniques that promote metacognition and ideas to help instructors incorporate inclusive practices into the classroom. The event was hosted by the College of Science and sponsored by Inclusive Excellence.
January, 2019 – Local WROC TV Interview with Inclusive Excellence Community Strand | Diversity Theater Director, Tina Chapman DaCosta

[Link to Interview]

February, 2019 – RIT Spotlight with Two Inclusive Excellence Classroom Practice Faculty Cohort Members and Student Deirdre Cannon

[Images of Deirdre Cannon creating art and interacting with a professor]

Art in Science
First-year Biotechnology & Molecular Bioscience student, Deirdre Cannon works on the graffiti as an HIRM Inclusive Excellence project being encouraged by Community Strand faculty colleagues Beth VanMiddlesworth, lecturer, CSE; and Dawn Carter, senior lecturer, GEMS. The incentive to create science in an art form opens up conversation, deepens inclusion, and engages students to communicate individual interpretations through a universal vehicle.
SoPA lecturer recognized for efforts to enhance diversity

Jennifer Connelly, SoPA lecturer, was named as the 2018-19 Isaac L. Jordan Sr. Faculty Philanthropy Award recipient. Jennifer is being recognized for significant contributions to enhance diversity in the university through a variety of channels, including her work with the HHMI Inclusive Excellence program. Award recipients will be honored at an awards ceremony at Ingle Auditorium on April 16, 2019.

Our Stories and News

COS welcomes John Wiley Jones Distinguished Speaker for talks on research and faculty mentoring

The College of Science and the Thomas H. Gosnell School of Life Sciences welcomed Dr. Beronda Montgomery, Foundation Professor in the Plant Research Laboratory at Michigan State University as this year’s John Wiley Jones Distinguished Speaker. In her lecture, titled “Seeing the Light: Plant Color Vision and Developmental Acclimation,” Dr. Montgomery shared her research about the specific mechanisms of light mediation affecting the growth and development of plants. Although her studies are on the cellular scale, her findings are adding significantly to the knowledge of our natural world.

In addition to her significant research on plant development, Dr. Montgomery is also an expert on faculty development and mentoring. In this capacity, she was invited by the Inclusive Excellence Initiative to give a second presentation on that topic. Her workshop, “Lighting the Way: Building Bridges to Access and Success Through Progressive Mentoring” translated the lessons that have emerged from investigating the specific ways in which largely immobile organisms adapt their patterns of growth and development to fluctuations in external environmental parameters to increase their survival and productivity by mentoring and professional development interventions. These lessons are intended to inform practices that promote the success of participants in academic sciences.
March, 2019 – Ben Zwickl Wins Federal Award

CASTLE’s Learning Assistant Makes RIT News
https://reporter.rit.edu/features/castle-learning-assistants

April 28, 2018  by Susan Gawlowicz  Follow @SGawlowicz

Graduating biotech major found enriching experiences at RIT

Ashley Adair, a graduating biotechnology major at RIT, is finishing her last semester on co-op at Vaccinex Inc., a biotech firm in Rochester, N.Y.

University Communications is highlighting a few members of the Class of 2018. See more commencement news at rit.edu/news/commencement.

CASTLE LEARNING ASSISTANTS

by Saimaa Mustafa | published Apr. 19th, 2018
May, 2019 – RIT Spotlight

Inclusive Excellence hosts two workshops

The Inclusive Excellence team hosted two workshops for peer institutions on April 12 and April 13. The HHMI Great Lakes Peer Implementation Cluster (PIC), which includes representatives from Oberlin College, Kenyon College and Lawrence Technical Institute, gathered at RIT on April 12. Attendees were lead through exercises conducted by the Alan Alda Center for Communicating Science to share ideas and develop strategies about communicating effectively with faculty, staff, students, and institute administrators.

On April 13, Project Kaleidoscope (PKAL) held its Upstate New York Regional Network meeting at RIT. This meeting attracted STEM faculty from all around the upstate New York area, including Syracuse, Cornell, Buffalo, Geneseo, and Alfred to discuss Faculty Development for Inclusive Excellence in STEM.

PEER Program in Rwanda - Read entire article. . .
May, 2019 – RIT Campus Spotlight: CASTLE 6th Annual Symposium

Jacob Melvin, a fourth-year student in the School of Individualized Study from Syracuse, N.Y., explains his research to Sithu Nguho, a lecturer in physics. RIT’s Center for Advancing STEM Teaching, Learning, and Evaluation held its sixth annual CASTLE Symposium on May 8. The event celebrated faculty and student research and work focused on improving STEM education.