Riley Ruskamp Chosen for 2021 MATC Student of the Year CUTC Award

The annual January Transportation Research Board (TRB) conference in Washington DC takes a night to honor exemplary students from University Transportation Centers (UTC) across the nation. Awards are given at the Council of University Transportation Centers (CUTC) virtual student banquet in which awarded students compile a short video to talk about their area of study or research and future plans.

UTC Outstanding Student of the Year awards are given to candidates based on accomplishments in technical merit and research capability, academic performance, and leadership. Riley Ruskamp was chosen by the MATC selection committee after nomination from his supervisors at the Midwest Roadside Safety Facility (MwRSF).

As a student leader at MwRSF, Ruskamp documents crash tests, trains new graduate students, presents research results to state Department of Transportation sponsors of the Midwest Pooled Fund Program, and participates in MwRSF's outreach efforts by showcasing engineering to disadvantaged youth. "His quiet, humble, yet capable and poignantly thoughtful personality compliments his kindness, compassion, and charisma," Dr. Cody Stolle, researcher at MwRSF says of Ruskamp. Ruskamp was the top student in Dr. Stolle's class and sets an example for all student researchers by independently learning and growing as a researcher while leading projects that support the MATC UTC objective of increasing road safety.

Ruskamp's Master's advisor Dr. Mojdeh Asadollahi Pajouh nominated Riley after witnessing his leadership on his MATC sponsored Master's Thesis project. The project aimed to provide state DOTs and transportation communities a high-performance, crashworthy, portable concrete barrier while resolving critical issues with current barriers. The project evaluated new designs of roadside portable barriers to limit deflection while reducing vehicle instability, occupant...Continued on page 2
risk, and exposure to critical outcomes, which was foundational to advancing a next-generation barrier design optimized for safety, economics, and sustainability. Dr. Pajouh describes Ruskamp as “a sharp and talented student with great dedication and work ethic.”

For the TRB conference, Ruskamp prepared a research manuscript titled “Development, Crash Testing, and Evaluation of Portable Concrete Barriers Gap-Spanning Hardware”. The publication also included a presentation touching on the Portable Concrete Barrier (PCB) research. In his video at the awards banquet, Ruskamp briefly shared what he does at MwRSF and thanked Dr. Stolle and Dr. Pajouh for their leadership and nomination.

MATC After-School Program Expands in Outreach and Curriculum

The Spring 2022 semester returned the MATC Roads, Rails, and Race Cars (RRRC) After-School program to schools in Lincoln. With the program’s resurgence, new ideas on Science, Technology, Engineering, Art, and Math were introduced in the club’s projects. In addition to the activities teaching students about the science and engineering behind transportation, it also taught students how art and engineering could be combined. For example, students learned about fundamentals of structural engineering, then applied those to creating free standing sculptures.

MATC expanded the outreach of the Roads, Rails, and Race Cars program by offering a Fun Day to Saratoga Elementary School. On a no-school day in February, students participated in a range of activities, similar to the ones in the RRRC after-school program curriculum.

The students designed a tipi using craft sticks and construction paper, learning why the structure’s design worked so well for the nomadic Native Americans. They constructed a catapult and tested it with marshmallows, seeing whose would launch them the farthest. This gave the students an example of the science behind machines, and how the more potential energy stored in the rubber band, the farther their projectiles will fly. The students had a lot of fun building travois and racing them across the gym. They learned how the design would enable Native American tribes to efficiently carry large loads as they moved from place to place.
MATC After School Program at Umóⁿhoⁿ Nation Public School Carries On Amidst Travel Restrictions

Prior to the COVID 19 Pandemic, MATC’s Roads, Rails, and Race Cars (RRRC) After School program was implemented at several sites outside of the Lincoln area. The pandemic caused suspension of outreach activities at all sites, and limited engagement and restrictions as schools began to re-open. At the Umóⁿhoⁿ Nation Public School (UNPS) in Macy, NE, Alternative Education Teacher Michele Blackbird stepped up to lead the club. Along with Nicholas Stubbs, another teacher at UNPS, the two carried on weekly club activities with enthusiastic elementary and middle school students.

Michele Blackbird has been a long-time MATC collaborator. In 2017 she joined as a Sovereign Native Youth STEM Leadership Academy teacher, and serves as the host teacher at Umóⁿhoⁿ Nation Public School for RRRC during the regular school year. Throughout the years she has added much to both programs. In particular, during a period of limited school access, she created video lessons and activities with a Native American STEM and transportation focus that have become part of the regular RRRC curriculum.

In Spring 2022 the OMICRON variant caused another round of travel restrictions that limited MATC in-person participation. Thanks to Michele’s leadership, club activities continued uninterrupted. The semester saw the introduction of new curriculum materials related to Art and Engineering and implementation at UNPS was enriched with contextualization to Umóⁿhoⁿ culture provided by Michele.

MATC Education and Outreach Coordinator Recruits Native American Students for 2022 Summer Academy

MATC is excited to offer its Sovereign Native Youth STEM Leadership Academy on June 26 - July 1, 2022. Affectionately known as the “Summer Academy,” this program is a week-long residential program on the campus of the University of Nebraska-Lincoln (UNL), for Native American High School students. The theme for 2022 is, “Native Youth for the Seventh Generation,” a reference to the Seventh Generation Principle, which is that tribal decisions ought to benefit the people seven generations on. The week’s activities are grouped under the headings of Cultural Appreciation, Health and Wellness, and Nature Stewardship.

The Summer Academy has been hosted by MATC since 2017, when a partnership was formed with the Nebraska Commission on Indian Affairs, who previously implemented the program. In-person programs have been suspended since summer 2020. Nevertheless, enthusiasm and support have been maintained at the many schools that send students down for the week.

This Spring, MATC Education and Outreach Coordinator Gabriel Bruguier traveled to numerous schools to recruit students. One leg of the recruiting efforts was through Lincoln Public Schools, where he was a featured speaker at several Native American clubs. The other leg took him outside of Lincoln, where he spoke to students and teachers at Winnebago Public School, Santee Community School, Umóⁿhoⁿ Nation Pubic School, and Niobrara Public School. At each site he was greeted with students eager to return to the Summer Academy, and students eager to experience it for the first time. Registration for the Summer Academy is at 50 students, exceeding numbers reached every year prior.
The Nebraska Safety Center at the University of Nebraska at Kearney (UNK) has been touring college transportation centers in hopes of expanding their capabilities when they move their location on the UNK campus.

During their visit at MATC, center personnel from the administration office and Midwest Roadside Safety Facility (MwRSF) gave presentations and tours over the center’s capabilities, research, and outreach. MATC Director Dr. Aemal Khattak gave an overview of the center’s history and explained the regionalization and funding distribution for University Transportation centers from the US Department of Transportation. Each federal grant lasts approximately five years and has a different research focus. The current period emphasizes transportation safety. Previous and ongoing MATC research has been conducted studying safety at bridges, rail crossings, highways, and more.

Outreach Coordinator Dr. Gabriel Bruguier gave an overview of the various outreach programs MATC offers including the Roads, Rails, and Race Cars after-school program, the Summer Native Youth STEM Leadership Academy, the Tribal Colleges and Universities Scholars Program, and the Historically Black Colleges and Universities Scholars Program. These programs all serve the purpose to provide STEM leadership to underrepresented groups of students from kindergarten to post-secondary and encourage students to further their education. Program Coordinator Janet Renoe gave an overview of the MATC Internship Program for undergraduate engineering students. The program connects students with summer internship opportunities in their field and gives them resources to make the most of their experience.

Dr. Karla Lechtenberg gave a presentation on the MATC umbrella organization, the Midwest Roadside Safety Facility (MwRSF). She provided insight into the capabilities of MwRSF given their Visualization and Simulation Lab and their Materials Testing Lab, both of which are available for use outside MwRSF personnel. Current MwRSF research is focused on heavy trucks and work zone safety.

Multiple research projects are conducted each year by professors and students under MATC. Dr. Ernest Tufuor gave a presentation titled “The Sweet Sound of Safety” on his research project testing rumble strips and their effectiveness after road construction. He explained how research benefiting state Departments

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of Transportation (DOTs) by having a practical application and financial benefits is ideal to get support from the state DOT.

Larissa Sazama gave the visitors a tour of MATC’s Intelligent Transportation Systems (ITS) lab and its capabilities for presentations and viewing live traffic footage. She also explained the capabilities of the ITS van and trailer, which have many functions for monitoring traffic and conducting research outside the lab.

The UNK Safety Center was established by Nebraska legislation in 1978. Their website explains “we exist to conserve human

MATC Affiliates Meet as TRB Conference Returns to In-Person

The Transportation Research Board’s (TRB’s) 101st annual meeting returned to an in-person event at the Walter E. Washington Convention Center in Washington, DC. The conference hosted policy makers, administrators, practitioners, researchers, and representatives of the government, industry, and academic institutions for over 400 sessions and workshops. Thirty sessions gave special attention to issues dealing with COVID-19 ramifications. Over 35 sessions cover the conference’s spotlight theme of “Innovating an Equitable, Resilient, Sustainable, and Safe Transportation System”.

The MATC Affiliate Dinner was January 9, 2022 at Carmine’s Italian Restaurant in Washington, DC. Thirty attendees from the Missouri University of Science & Technology, University of Nebraska-Lincoln, Florida International University, University of Kansas, University of Tennessee–Knoxville, and University of Kansas Medical Center met for dinner and conversation after only being able to attend the conference virtually for the past two years. It was an opportunity to see and hear from other researchers and students conducting research at MATC and other university transportation centers.

The entire conference was from January 9 to 13 and included session presentations and student posters with topics like TMS capabilities, cyber resiliency, rail planning and implementation, pile resistance technology, BIM and more. All presentations from the conference are listed on their website.

The next TRB conference is scheduled for January 8-12, 2023 with the spotlight theme “Rejuvenation out of Disruption: Envisioning a Transportation System for a Dynamic Future”.

About the Mid-America Transportation Center

Since 2006, MATC has been designated as the US DOT Region VII University Transportation Center. Region VII is composed of Iowa, Kansas, Missouri, and Nebraska. MATC is a consortium of nine universities. The University of Nebraska-Lincoln (UNL) serves as the lead institution, and MATC has its headquarters on the UNL campus.

MATC’s research priority is promoting safety with an emphasis on reducing the number of incidents involving hazardous material transport, mitigating the negative effects of crashes, and improving emergency response to unexpected events.

MATC’s education priority includes increasing the number of students from underrepresented groups in STEM education and transportation-related careers.