

## News Release

# Research Examines Chemical Behavior, Implications

By Elizabeth Tollefson on Thursday, July 16, 2015

The chemical computations of last summer have taken two students at the University of Minnesota Crookston to a lab at Villanova University. Seniors Emmett LaCoursiere, Red Lake Falls, Minn., and Michael Laurich, Lansing, Ill., along with Assistant Professor Tim Dudley, are creating the compounds they previously had only investigated using computer modeling. Through the modeling, the duo used math and physics to predict chemical behaviors in the study of benzimidazoles and what happens when these molecules are altered.



Of particular interest to LaCoursiere, an animal science, pre-vet major, is the fact that the research has implications in the field of animal science as it relates to pharmaceutical use in the medical treatment of animals. "There is a similarity to compounds used in the treatment of internal parasites," LaCoursiere says. "Through our research, I have gained a much greater understanding of chemistry and how it could affect the field of vet medicine." The work could also lead to the development of synthetic molecules in the future, and there is potential for the project to move into a biological study as well.

 "We wanted to limit the variables down to a very small system," Laurich says. "And, working with smaller molecules makes them easier to control."

The students began the study with computer modeling but when it came to characterizing the new molecules they created in the lab, they required specialized equipment that was unavailable on campus. Since Dudley started working on this benzimidazole research as a faculty member at Villanova, his continuing research with LaCoursiere and Laurich took him back to the laboratory at his former institution with the help of a University of Minnesota Grant-in-Aid.

The goal was to find alternative molecules that mimic important biological processes involving proton-coupled electron transfer (PCET). These reactions play an important role in both chemical and biological processes including such processes as photosynthesis. PCET reactions involve the synchronized transfer of an electron and a proton. The most rewarding part of the work by Dudley and his students was the compounds they created were determined to be very pure, which impressed those at Villanova who are involved in the project.

Dudley also points out the valuable assistance of U of M Crookston Associate Professor Venuopgal Mukku who played a significant role with the characterization of the molecules through his expertise in organic chemistry.

"The real advantage of the Crookston campus is our size," Dudley says. "Students have direct access to faculty, and they have research opportunities that involve not only looking at something on a computer but taking it to the lab. And, these two student demonstrate this fact by the way they took advantage of the opportunity and created about a half dozen compounds that are now a part of a broader study."



LaCoursiere and Laurich presented their work in November 2014 at a meeting of the Midwest American Chemical Society in Columbia, Missouri. LaCoursier will be attending veterinary medical school at the University of Missouri starting this coming fall. Laurich will present the latest research this fall, and he is planning to attend graduate school to study in the area of marine biology. The two agree that research with faculty members has benefited them both significantly and they hope to continue conducting research in their respective fields as they move forward.

The University of Minnesota Crookston now delivers 33 bachelor's degree programs, 22 minors, and 36 concentrations on campus as well as 14 degree programs entirely online. These degrees are offered in the areas of agriculture and natural resources; business; liberal arts and education; and math, science and technology. With an enrollment of 1,800 undergraduates from more than 20 countries and 40 states, the Crookston campus offers a supportive, close-knit atmosphere that leads to a prestigious University of Minnesota degree. "Small Campus. Big Degree." To learn more, visit [www.umcrookston.edu](http://www.umcrookston.edu).

In the photos:

Top, right: Seniors Emmett LaCoursiere and Michael Laurich use the blackboard to look at molecular structure.

Top, left: LaCoursiere performs vauum filtration to collected their precipitated product.

Bottom, right: Laurich and LaCoursiere look at results from the vacuum filtration.

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