HNRS 3035 Natural Science Colloquium:
"3D Image Acquisition and Analysis: A Multidisciplinary Field with Broad Applications in Science and Medicine"
by
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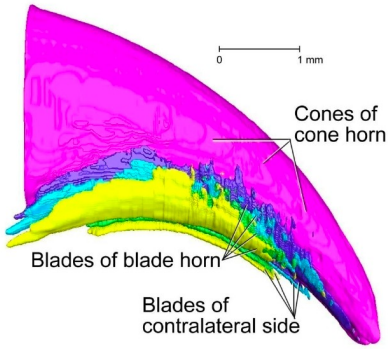
at 1:30-3PM Tu-Th, French House

3D imaging is a dynamic, multidisciplinary field that requires an understanding of science and mathematics and finds applications in the sciences, medicine, engineering, and the arts. The interdisciplinary nature of the course lends itself to being team-taught. The course is geared for advanced students in mathematics, physics, chemistry, biological sciences, engineering, geology, and computer science. The subject is of special value to Honors students interested in working in a health-related profession, but with an inclination towards the physical sciences. The students are expected to have taken courses in calculus (at least through MATH 1550), chemistry, physics, and at least one 3000-level course in the student's major. The students are also expected to have a basic understanding of a graphics program, such as Photoshop. Enrollment is by permission of instructor.



The claw-shedding mechanism in the domesticated cat is part of a structural-functional complex. The internal architecture of the cornified claw has been imaged by tomography and SEM and visualized in software.

The course will have a combination of lectures, hands-on lab (running a small X-ray tomography instrument), field trips to imaging equipment at Our Lady of the Lake radiology department, and to the CAMD synchrotron tomography beamline. A new computer lab has advanced visualization software for processing and visualization of supplied and new data sets. Labs will be in the 1:30-3PM period, but additional access time will be permitted and expected. There will be a capstone team project by small teams (2-3 students) working with student-acquired data.

When students complete this course, they will have learned:
"The principles of X-ray tomography, both theory (lectures) and practice (lab projects).
"A sampling of the on-going research in mathematics for image acquisition and analysis.
"Some computer workstation expertise with image visualization software.
"A survey of applications of 3D imaging to problems in medicine, engineering, materials science, and more.