Notre Dame Specialists Create 3D Images to Aid Surgeons

University of Notre Dame

University of Notre Dame researchers have successfully created three-dimensional anatomical models from CT scans using 3D printing technology, a process that holds promise for medical professionals and their patients. A paper by the researchers, "3D Printing of Preclinical X-ray Computed Tomographic Data Sets," was published in the *Journal of Visualized Experiments* this week.

The strategy was initiated last spring by then-freshman Evan Doney, a Glynn Family Honors student in the laboratory of W. Matthew Leevy, research assistant professor at the Notre Dame Integrated Imaging Facility. "It's a very clever idea," Leevy says. "He did a lot of it independently. He figured out how to convert the tomographic data to a surface map for editing and subsequent 3D printing."

The paper reports results based on using X-ray CT data sets from a living Lobund-Wistar rat from the Freimann Life Science Center and from the preserved skull of a New Zealand White Rabbit in the laboratory of Matthew Ravosa. Coauthors of the article with Doney, Leevy, and Ravosa are Lauren Krumdick, Justin Diener, Connor Wathen, Sarah Chapman, Jeremiah Scott and Tony Van Avermaete, all of Notre Dame, and Brian Stamile of MakerBot Industries LLC, a 3D printing company.

"With proper data collection, surface rendering, and stereolithographic editing, it is now possible and inexpensive to rapidly produce detailed skeletal and soft tissue structures from X-ray CT data," the paper says. The translation of pre-clinical 3D data to a physical object that is an exact copy of the test subject is a powerful tool for visualization and communication, especially for relating imaging research to students, or those in other fields."

"Our project with 3D printing is part of a broader story about 3D printing in general," Leevy says, adding that the work has spawned several more ideas and opportunities, such as providing inexpensive models for anatomy students. "There's a market for these bones, both from animals and from humans, and we can create them at incredibly low cost. We're going to explore a lot of these markets."

A clinical collaborator, Dr. Douglas Liepert from Allied Physicians of Michiana, is enabling the researchers to print non-identifiable human data, expanding the possibilities. "Not only can we print bone structure, but we're starting to collect patient data and print out the anatomical structure of patients with different disease states to aid doctors in surgical preparation," Leevy says.

For more information visit www.nd.edu [1].

Source URL (retrieved on *03/09/2014 - 11:49am*):
http://www.mdtmag.com/news/2013/04/notre-dame-specialists-create-3d-images-aid-surgeons

Links:
[1] http://www.nd.edu