

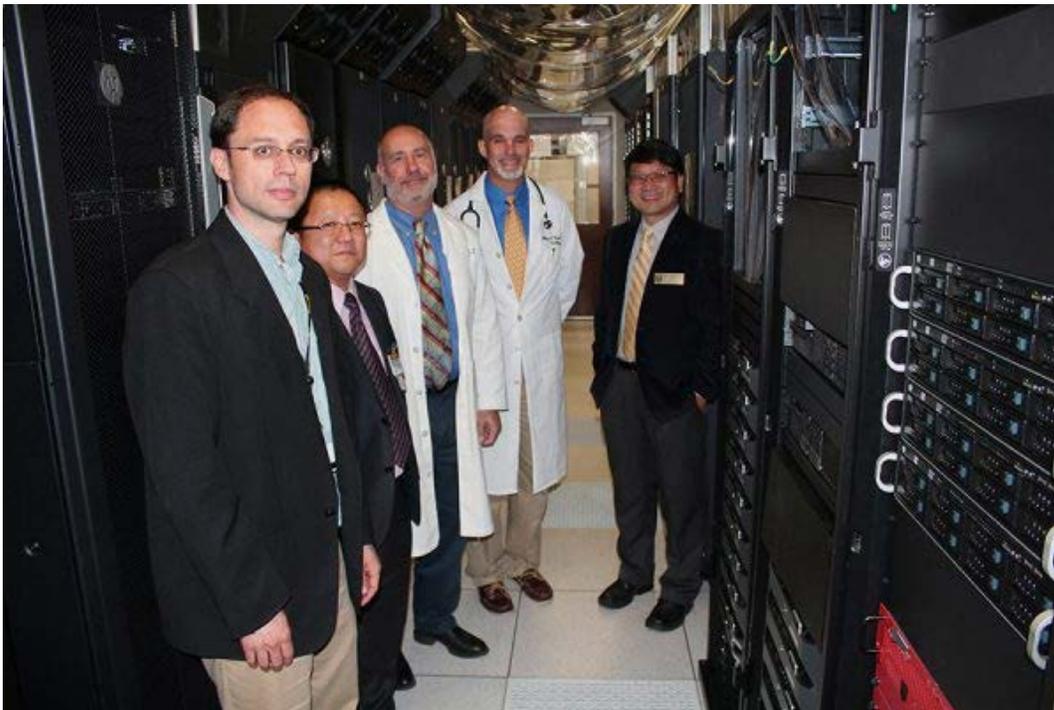


## Collaborative effort leads to unique informatics program

Posted By: [Ryan Owens](#) on Tuesday, May 10th, 2016

◀ Previous

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A new doctoral program will take on six students for its first class, recruiting prospective students from life sciences, medicine and computing disciplines for a Ph.D. track in informatics based around the theme "Massive and Complex Data Analytics: Pre-doctoral Training in One Health." From left: Timothy Middelkoop, director of Research Computing Support Services; Dmitriy Shin, assistant professor of Pathology and Anatomical Sciences and founding director of the Division of Pathology Informatics; Richard Hammer, clinical associate professor of Pathology and Anatomical Sciences; Jeffrey Bryan, associate professor of Oncology, section chief of Oncology, Veterinary Medicine and Surgery; Chi-Ren Shyu, chairman and Shumaker Endowed Professor of Electrical and Computer Engineering. *Image courtesy of the Division of IT.*

MU's College of Engineering, College of Veterinary Medicine and School of Medicine see the need for a new breed of well-rounded researchers, and a five-year, \$1.5 million grant from the National Institutes of Health will help the University of Missouri pave the way in biomedical informatics.

A new doctoral training program is looking for six students for its first class, recruiting prospective students from life sciences, medicine and computing disciplines for a Ph.D. track in informatics based around the theme

“Massive and Complex Data Analytics: Pre-doctoral Training in One Health.” A total of 23 MU faculty members from various backgrounds will team up to train the students with the goal of creating a unique type of data scientist, one who can improve the speed of medical discoveries through new abilities to analyze animal and human data using Big Data practices.

The reason the study will start with animals is that animals act as sentinels, meaning they may show signs of exposure to toxic or infectious hazards in the environment before humans, providing a kind of early warning system for identifying and addressing environmental risks. Additionally, people and animals share a multitude of common diseases and their study is the object of comparative medicine.

“From [animal testing] to clinical trials, normally that would take a long time. It could be more than 10 years,” said the grant’s principle investigator [Chi-Ren Shyu](#), chair of the Electrical and Computer Engineering Department and director of the MU Informatics Institute. “So how are we going to speed up that process? A data-driven approach is very important. Efficiently but rigorously running through clinical trials from animal models, then using Big Data processing, should hopefully shorten the gap.

“That’s the breed of informaticians we want to train — those who can take the findings from animal data and bring them to better understand human diseases. It’s our goal to produce data scientists and informaticians who can connect the dots from animal health to human medicine, and then explain the meaning of the results.”

Courses to achieve the necessary skillset include several in data science, informatics and Big Data, and the students also will participate in a student-driven seminar series in order to propose and present research before peers and mentors, as well as required tri-lab rotations in veterinary medicine facilities, engineering computing groups and clinical labs from School of Medicine. The sextet also will have to develop their own Big Data analytics tools and complete an individually-tailored set of courses based on their previous educational backgrounds and future career aspirations. Some of the key faculty involved with the project are: Timothy Middelkoop, research computing director; Dmitriy Shin, translational bioinformatics director; Richard Hammer, pathologist; Jeffrey Bryan, veterinary medicine director; and Shyu, project director.

They’ll have plenty of data to work from, since the national [Veterinary Medical Databases \(VMDB\)](#) is currently hosted at MU College of Veterinary Medicine. The VMDB database has more than 7 million records deposited by 26 universities since the 1960s. For human health data, the UM Healthcare System, in collaboration with Cerner, recently received HealthFacts data, which has more than 47 million unique patients.

“Our training is for problem understanding, cleaning the data set, processing the data set and interpreting an actionable plan for clinicians,” Shyu said.

From an engineering perspective, Shyu said the NIH grant (Grant No. 1T32LM012410-01) and new program is validation of the several years of effort put into making MU a world-class institution in the area of Big Data and informatics. It also reflects on the unique resources available at MU, which offers the rare combination of engineering, health and veterinary medicine all on the same campus.

“MU developed one of the first informatics training programs in the 1970s, when Dr. Donald A. B. Lindberg, former National Library of Medicine Director for 31 years until his retirement last year, established research and education programs designed to bring together expertise from computer science, information science, library

science, and medicine to tackle healthcare challenges. We have had this interdisciplinary informatics PhD program since 2008., MU built a good track record to produce many Ph.D. graduates who later become faculty members in other institutions,” Shyu said.

“We are happy to be part of the elite group of 12 training sites that are funded through this NIH BD2K program.”

The grant was funded as part of the Big Data to Knowledge (BD2K) program, and the goal of the program is “to enable biomedical research as a digital research enterprise, to facilitate discovery and support new knowledge, and to maximize community engagement,” per its website. Other T32 Intuitional Training sites include California-Berkeley, UCLA, Dartmouth, Harvard, Northwestern, Penn State, Stanford, Texas, Vanderbilt, Virginia, and Wisconsin.

Applications for potential students will be accepted until July 1.

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