



Putting Genetic Information to Work: Accelerating Personalized Care at Geisinger

The broad efforts at Geisinger to move towards personalized medicine are expected to accelerate under newly hired director for the Genomic Medicine Institute (GMI), Marc S. Williams, MD, and newly hired Janet Williams, MS, a certified genetic counselor (CGC). Together they will work to boost the presence of genetic medicine in the daily care of Geisinger patients.

"Among the quickly expanding possibilities of what can be done, we are most interested in identifying what should be done, what will be of the greatest value to patients and clinicians, and what systems we can build that

will integrate into the day-to-day workflow at Geisinger," Dr. Williams explained. "We expect to be involved in a very collaborative process across a broad number of specialties. The most successful projects will be those for which value is identified by the clinicians, the patients and the system, so that we improve care in the context of current priorities and needs. In particular, understanding the desires of patients and using this to prioritize interventions has not been adequately studied in relation to the use of genomic information. There is a huge opportunity if the patient

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The eMERGE Network Adds Geisinger To Assist Effort To Translate Genomic Data into Clinical Practice

As a recognized leader in the use of health information technology (HIT), and with an innovative database of patient genotypic and phenotypic data already in development, Geisinger Health System is poised to assume a significant role in the translation of genomic information into clinical practice, an effort that promises to be at the forefront of medicine—both in the lab and at the bedside—over the decades to come.

Geisinger has already achieved a major milestone in this process thanks to its acceptance into the eMERGE (Electronic Medical Records and Genomics) Network, a consortium of seven U.S.

medical research institutions established in 2007 by the National Institutes of Health (NIH). According to the NIH, eMERGE institutions study the relationship between genetic variation and clinical characteristics such as disease risk or treatment response, using techniques like genome-wide association analysis, and develop means to use that information to improve patient care. The eMERGE Network will receive \$25 million in NIH funding over the next 4 years. In the first year alone, Geisinger Clinic will receive \$841,000 in funding for participating in the program. Geisinger's eMERGE Network program

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Geisinger's Genomic Research Effort Uses Health System's Unique Strengths to Advance Studies

Medical researchers envision a future in which the role of genetic testing is a central element in health care. Individual genetic variations can signal differences in risk for disease and response to therapeutic intervention. Knowing what these genetic variants are will allow clinicians to adjust medications and dosages, and will help prevent and treat disease states in new, more effective ways.

Interpreting genomic information for the betterment of clinical care is a principal goal of today's medical research, and promises to be the key to successfully individualizing and optimizing future therapy. The goal of personalized medicine will become reality only after a concerted effort in both basic and clinical research to unlock the secrets of genomics. To do that, researchers will need a fully integrated health care delivery system that is powered with advanced health information technology – which is a hallmark of Geisinger Health System. They will also need a large, stable patient population on whom to base their genomics research – which Geisinger is fortunate to have. And they will also need an unusually robust biobanking program in which patient samples can link back to extensive electronic medical records, thereby providing the foundation for genomic

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experience can be integrated with this emerging technology."

More than 10 years ago, the excitement generated by efforts to map the human genome produced ambitious predictions of how genetic information would change healthcare, particularly by allowing medicine to be personalized. Of the many practical applications of personalized medicine, one is the opportunity to assess specific health risks before they occur. In patients who have a disease, another is the delivery of therapy closely targeted at the specific and dominant molecular processes in that individual. The genetic tests to permit this type of personalized medicine are now proliferating.

"Janet and I have been long-time collaborators in evaluating genetic tests and their value, both for informing patients of health risks and for understanding how the genetic information is relevant to changes in care that will improve outcomes. As the number of these tests increase, it is very important to consider how they can be integrated into patient care in a way that is relevant and helpful. We have been doing this at our current institution, and it is clear that it is not enough to know that there is a genetic test available. It is important to weigh the value of the information and to consider its impact on the existing opportunities for intervention," said Dr. Williams, who emphasized that personalized medicine is not synonymous with genomic medicine.

"The definition that I use to describe my philosophy of personalized medicine was published by Pauker and Kassirer in 1987. They state, 'Personalized medicine is the practice of clinical decision-making such that the decisions made maximize the outcomes that the patient most cares about and minimizes those that the patient fears the most, on the basis of as much knowledge about the individual's state as is available,'" Dr. Williams



Janet Williams, MS (left) and Marc S. Williams, MD (right) with David H. Ledbetter, PhD (center) in the Geisinger Center for Health Research.

explained. "The things that I particularly like about this definition are that it is centered around the patient and doesn't mention genetics at all. Clearly genetics and genomics is part of this knowledge, but this definition does not presuppose that they are more important than other types of knowledge."

While acknowledging that this philosophy "is perhaps a heretical view for a geneticist," Dr. Williams said, "I believe in the long run that holding to this approach will identify the best approaches to improve patient outcomes."

The reason that researchers already involved in genomic medicine at Geisinger are excited about the recruitment of these two scientists is that their expertise will build on a long-standing commitment to this area. David Ledbetter, PhD, Chief Scientific Officer at Geisinger, called the couple "national leaders in the field." However, this reputation was built not only on substantial contributions to genomic research but by the practical approaches they implemented during their previous

posts doing comparable work at the Intermountain Healthcare Clinical Genetics Institute in Salt Lake City.

The development of a family history tool that facilitates collection of a relatively comprehensive set of genetically relevant information was among their initiatives at Intermountain Healthcare. They also worked to form a healthcare policy regarding genetic testing that provided some objective parameters to guide efforts to move this field forward. One of the key advantages of Geisinger, shared by Intermountain, is a sophisticated electronic medical records system that permits information to be easily shared by different specialists who may apply genetic information in different ways.

The GMI will continue to be an important center of clinical research, but in outlining the roles he and his wife will assume at Geisinger, Dr. Williams frequently returned to the practical applications of this research. The information provided by genetic tests has the potential to revolutionize care,

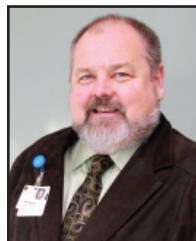
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New Investigator Profile: William A. "Andy" Faucett, MS, CGC

"My real career goal is to figure out how to harness the power of genomics to improve healthcare," said William A.

"Andy" Faucett, Director of Policy and Education for the Genomic Medicine Institute at Geisinger.

Geisinger's integrated health care system, Faucett believes, presents the perfect opportunity to do just that.



William A. "Andy" Faucett, MS, CGC

Faucett received his M.S. in Human Genetics from Sarah Lawrence College and is board certified by the American Board of Genetic Counseling. He worked as a genetic counselor at the Baylor College of Medicine from 1987-1989, and then established the pre-natal genetic counseling program at Memorial Hospital in Savannah, Ga.

In 2000, Faucett began a fellowship program at the Centers for Disease

Control and Prevention (CDC) researching ways to integrate genetics into a broader public health basis. In 2004, he began a faculty position at Emory University School of Medicine. He still maintains his relationships with both Emory as an adjunct faculty member and with the CDC as an expert scientist.

"The main project I worked on at Emory was called the Collaboration Education and Test Translation (CETT) Program, which took a test that had been developed in research and helped move it to a clinical laboratory." The CETT Program created a system to review clinical tests to determine which were ready for clinical use and provided additional funding to advance to the clinic. "I hope to do the same thing at Geisinger with new genetic discoveries."

Faucett is currently engaged in helping to build the Genomic Medicine Institute by identifying the people and processes needed to move forward. He was recently awarded funds from Pennsylvania-based Weis Markets Foundation for a regional family history

initiative. "Compiling family history data is important since it will assist Geisinger clinicians in developing targeted interventions for cancer, heart disease, obesity, and diabetes, and will increase research opportunities for other chronic diseases."

He is also involved in several research projects. "I am the primary investigator at Geisinger on a project for the Simons Foundation looking at both deletions and duplications for the chromosome region 16P11.2, which is associated with autism and developmental delay," explained Faucett.

"I am also working on a project related to the International Standards for Cytogenomic Array (ISCA) Consortium, which David Ledbetter, PhD, Executive Vice President and Chief Scientific Officer, helped create. We are working on how to encourage laboratories to contribute information to the database and how to make sure that information is used by researchers and clinicians to provide improved information."

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but this information is complex and not necessarily of immediate practical value. Diseases in many target organs, such as the heart or kidney, may represent the culmination of more than one pathologic process, often driven by interplay between multiple genetic factors and environment. Genetic tests are context driven.

"Most of the current genetic tests must be conducted at the right time in the right way in the right people. Otherwise, the information will not be useful for treatment decisions with the potential to improve care. There is a very considerable risk of conducting tests that waste time and money. This is an emerging field, and the decision

to introduce a specific genetic test must be based on whether this is of benefit to Geisinger patients," Dr. Williams cautioned.

Asked whether a position like his will soon be created within most major healthcare systems to harness the potential for genetic medicine to improve outcomes, Dr. Williams was pessimistic. To recognize this need, he noted, healthcare administrators need to recognize the emerging importance of genetic information for treatment and prevention rather than viewing it as an expensive new technology with no relevance to patient care. Janet Williams added, "Perhaps more relevant is the recognition of the resource role that genetic counselors and medical

geneticists can offer to other healthcare providers, hospitals, institutional pathology departments and payers in optimizing the contribution of specific genetic testing to healthcare within the local community."

"It is a rare healthcare system in which the potential for genetic medicine to improve outcomes is fully understood. Most healthcare systems are not set up in a way that encourages forward thinking. There is limited investment in the future or a vision of how this can change the paradigm for reducing the burden of human diseases," Dr. Williams said. "It will be exciting to join the effort at Geisinger, where we can explore where this will make a difference."

MyCode® Biobank is Vital Component In a Growing Number of Research Projects

Researchers across the Geisinger Health System are engaged in both basic and clinical research that seeks to further progress in the science of genomics. Central to these endeavors is the Geisinger MyCode® project, established in 2006.

MyCode is a large-scale biobank that collects and stores a variety of types of samples, including blood and tissue samples, from more than 35,000 Geisinger patients who have volunteered to participate. The goal of the project is to leverage Geisinger's large patient base and state-of-the-art electronic medical records (EMR) system to create a repository of patient samples (linkable to clinical data in the EMR system) for medical research.

"Originally the idea was to harness the patient base at the Geisinger Health System as a platform for translational genomics research," recalled David J. Carey, PhD, director, Weis Center for Research and principal investigator on MyCode. "As an integrated health system, we have access to comprehensive clinical data, and the area we serve has a fairly stable population. There's not a lot of migration. These factors are favorable for creating a database of clinical information that can be linked to a collection of biological samples for molecular research and clinical studies."

The idea for the MyCode biobank dates back to 2003 and was born out of discussions among Dr. Carey; Glenn S. Gerhard, MD, director, Geisinger Clinic Genomics Core; Walter "Buzz" Stewart, PhD, MPH, director, Center for Health Research; Geisinger Chief Scientific Officer David Ledbetter, PhD; Eric Green, MD, PhD, director, National Human Genome Research Institute; and geneticist Philip R. Reilly, MD, best known for his book, *The Strongest Boy in the World: How Genetic Information is Reshaping Our Lives*. All saw the potential for Geisinger to be a leader in the

The MyCode® project was recently expanded to include pediatric participants. This allows us to investigate the genetic basis of disease in children, and to follow participating children through adolescence and into adulthood. Having blood samples before and after a disease develops also allows us to identify molecular changes that accompany the onset of a disease. When both the parents and their children are enrolled in the program there is an option for parents to give permission to link their samples and associated data for research studies. The ability to study families is an extremely powerful tool for identifying disease-related genes. The ultimate goal is to use this information to provide personalized health care, thereby promoting disease prevention.

field of genomic research, given the size and nature of the patient base it serves.

"The idea has really evolved over time," Dr. Gerhard said. "There have been biobanks built around the world, in places like Iceland, the United Kingdom, and other European countries. In this country, of course, health care is sort of fragmented, but if you have a system with a large number of patients accessing care in a standardized sort of way, you have the ability to gather genetic information. We decided to leverage that ability at Geisinger."

Built with a \$500,000 grant from the Ben Franklin Technology Development Authority and additional funding from Geisinger Clinic's Research Fund, which at the time of its inception was managed by the Administrative Committee for Research, the MyCode biobank draws samples from Geisinger's network of 39 primary care clinics, as well as its specialty clinics in adult obesity, vascular surgery, women's health, and other areas.

Early on the project's leaders conducted focus groups with both patients and providers within the system to identify the most effective ways to collect samples and to address any potential concerns. Patients were enthusiastic, but wanted the ability to provide consent. As a result, a consent process was developed in which eligible patients meet with a research assistant who explains the MyCode project, answers questions, and

invites them to consider participation. Interested patients sign a written consent/HIPAA authorization form and agree to provide blood samples for broad research use and permit access to data in their EMR for research. The consent form states that research done with their banked samples could include analysis of their genes.

The forms patients are required to fill out are easy to understand and take only a few minutes to complete. Additionally, there are no extra blood draws required for patients who agree to participate. Samples are taken when their blood is drawn for other purposes, although some patients may be asked to provide additional samples at a later date.

Because of these initiatives, Dr. Carey said, roughly 80% to 85% of the patients who are invited to submit samples agree to do so. These samples are processed, stored, and tracked in the Geisinger Clinic Genomics Core, using quality control measures established by the Clinical Laboratory Improvement Amendments. In all, more than 100,000 samples have been collected from 20,000 patients at Geisinger's primary care clinics, and an additional 40,000 samples have been collected from 15,000 patients visiting various specialty clinics.

"We have developed a pretty representative sample based on age,

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Biomarker Research in Heart Failure Identifies Diagnostic Marker Pinpointing Disease Months Before Diagnosis

Heart failure is a national problem that carries with it a significant burden in terms of health care costs and impact on patient quality of life. Researchers at Geisinger Health System, led by Walter “Buzz” Stewart, PhD, MPH, are hoping to identify a serum biomarker that will allow clinicians to detect heart failure much earlier than typically occurs in the primary care setting and to initiate interventions that may help to slow progression and improve patient outcomes. A biomarker is any objectively measurable characteristic that indicates either a normal or pathogenic physiologic process.

“We are interested in looking at biomarkers that offer the earliest and most reliable signal of a pending diagnosis 12 to 24 months before it usually occurs and then exploring how we can use low-cost interventions to change the natural history,” said Dr. Stewart, an epidemiologist with an expertise in employing health care information technology (IT), such as that used in electronic health records (EHR), for outcomes research. “Heart failure is among the most expensive diseases for Medicare, and it poses an enormous burden to patient functioning and health. Anytime you have the ability to accurately predict the future you have an opportunity to change the course of things and to create value. That is effectively what we are trying to do with our research.”

The Centers for Disease Control and Prevention estimates that heart disease and stroke account for more than \$400 billion in health care costs annually. Research efforts such as the one being led by Dr. Stewart are now attempting to reduce that number by identifying biomarkers common to heart failure patients that can be used as a diagnostic marker to enable an earlier diagnosis or, alternatively, as a potential therapeutic target. The theory is that if patients

Jay Jones, PhD: Great Research Starts With Clean Data

Jay Jones, PhD, Director of Chemistry for Geisinger Medical Laboratories, has the advantage of the long view, as his 30-year tenure has afforded him an unusual vantage point from which he has experienced Geisinger’s remarkable progress through the years.

Some of that institutional progress has been by his own design, as Dr. Jones has been instrumental in developing the system through which specimens are obtained, transferred and stored in a standardized fashion.

“This is all about pre-analytical quality control,” Dr. Jones said. “We have set up standardized systems that allow us to get our specimens – the ones, for instance, that are used in the project to identify biomarkers for congestive heart failure – in a uniform way, so we know exactly how the specimens are handled through collection, transfer by courier, and processing into the bio-repository.

“We have very good tracking mechanisms for temperature and time. We know the thaw conditions when we take samples out of cold storage, for example, and we know how long it takes to transport specimens from various Geisinger medical sites to the bio-repository.”

For Dr. Jones, there is a direct line from the clean data that his specimens provide, to the identification of biomarkers for congestive heart failure, and finally to a best-practice alert that pops up on the clinician’s EHR computer screen alerting him or her to possible risk factors for the disease, and thereby making a substantial difference in a patient’s care.

“I have to say, it has been gratifying working at Geisinger for these 30 years to see how far we’ve gone....”

can be screened for heart failure they can be diagnosed before the disease has progressed too far and thus can possibly change its course.

Dr. Stewart and his team at Geisinger launched the heart failure project in 2007. Their goal was to use longitudinal EHR data accrued from patients visiting Geisinger’s primary care clinics. They developed a robust model that detected heart failure an average of 15 months earlier than when the diagnosis first appeared in the patient’s medical record (the area under the receiver operator characteristic curve was 0.80).

The team applied its predictive model in real time to the EHR data from all adult primary care patients aged 50 years and older and identified

approximately 10,000 patients with a moderate to high risk score, which was based on a combination of 42 variables. These 10,000 patients, and an additional random sample of 3,000 more, were followed longitudinally for 24 months. From this sample, Geisinger researchers identified 430 newly diagnosed heart failure patients, 210 of whom had at least one serum sample banked before they were diagnosed. To date, three different biomarkers have been studied. One biomarker in particular reliably detects heart failure as far back as 18 months prior to diagnosis.

According to Dr. Stewart, the collaboration among the researchers,

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MyCode® Biobank is Vital Component

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gender, and race that is generalizable for the whole region," Dr. Carey said.

The MyCode Governing Board evaluates requests for access to biobanked samples for research on the basis of scientific merit and potential clinical impact. Clinical data linked to biobanked samples is obtained through a data broker, which ensures the confidentiality and privacy of the patients.

Geisinger researchers are using samples in the MyCode biobank for a number of research projects. According to Dr. Carey, ongoing studies are attempting to identify genetic markers for fatty liver disease, diabetes, and obesity. For example, Dr. Gerhard is leading a team of researchers hoping to find genetic markers that can be used to predict outcomes in bariatric surgery. The basis for this research is the 4,000 patients from Geisinger's obesity clinic who have submitted DNA samples to the MyCode biobank. Dr. Tooraj Mirshahi, a staff scientist at the Weis Center for Research, has identified variants in a gene that controls eating

behavior and is associated with improved long term weight loss after surgery.

Another study uses samples drawn from the vascular surgery specialty clinic for a study on abdominal aortic aneurysms (AAAs), which are typically diagnosed in older men. According to Dr. Carey, family history of an aneurysm is a strong risk factor for AAA, and researchers at Geisinger are using next-generation DNA sequence analysis to identify genetic variants that may be associated with the development of AAAs.

"Currently there are no medical treatments for abdominal aortic aneurysms," Dr. Carey said. "The only option is surgery or endovascular repair. Our hope is that we can identify new mechanisms to use as potential therapeutic targets. Diagnosis of AAAs is also an issue; there is ultrasound screening but it is not widely done and not very practical using current guidelines. Our hope is that we can identify genetic variants that can be used in diagnosis. We can screen for these

variants, refine the criteria for screening, and save both lives and money."

Other studies include research to identify genetic factors that predispose certain women to preeclampsia and a study that examines the relationship between a genetic variant associated with obesity and breast cancer. MyCode samples are also used for a 3-year study funded by the Centers for Disease Control and Prevention (CDC) that hopes to measure acquired genetic mutations associated with polycythemia vera. "The CDC is interested in knowing the rate of mutation for polycythemia vera in this region and elsewhere," Dr. Gerhard said. "With MyCode, we can help them do that quickly using our existing bank of DNA samples."

Ultimately, those heading up the MyCode project hope to one day collect genetic sequence data for every patient in the Geisinger system. They envision a day when genetic testing ultimately becomes a vital component in the treatment of a wide array of diseases and disorders.

Biomarker Research in Heart Failure

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including Jay Jones, PhD, Director of Chemistry for Geisinger Medical Laboratories (see sidebar) and Geisinger's technology department is the key to the success of this study model. He noted that the project reveals how the existing clinical IT and laboratory medicine infrastructure can be used to efficiently evaluate diagnostic biomarkers and that this research is made possible, in part, by Geisinger's system-wide EHR and clinical laboratory services.

"Access to such robust data resources offers a unique collaborative research and testing environment, and Geisinger is the only place that offers the integration of

research and lab processes in one place," Dr. Stewart said. "It allows for our fairly radical ideas for this study, in terms of design and scope. Typically, when you are looking at future diagnosis, you need a large cohort. The study could cost millions of dollars and take 5 to 7 years to complete. Through this collaboration, we have developed a novel way of short-cutting all of that."

Indeed, the study's primary funding comes from a grant from Roche Diagnostics for \$400,000. Dr. Stewart said the team plans to publish the full results of the study—including the identification of the relevant

biomarkers—sometime in 2012.

"Ultimately, the identification of a genetic biomarker in heart failure will enable us to improve diagnosis, diagnose the disease earlier, and potentially provide patients with guided therapy, targeted to their specific disease," he said. "It would be great if we could explore this further in a randomized clinical trial designed to identify the biomarker. If we could do that, we could perhaps develop a therapeutic intervention and determine if the new agent improves outcomes. Changing the natural history of this disease is really important, and that is our goal with this project."

The eMERGE Network Adds Geisinger

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is named Geisinger eGenomic Medicine (GeM).

"This is a major step," said David H. Ledbetter, PhD, Geisinger's Executive Vice President and Chief Scientific Officer. "Participation in the eMERGE Network provides our physicians and researchers with access to a much larger pool of patient data and puts us in a position to collaborate with some strong research groups. It also could open our researchers up to some additional grant opportunities in the coming years."

Geisinger officially joined the network's five original members—Mayo Clinic, Vanderbilt University Medical Center, Group Health Cooperative (University of Washington), Northwestern University Medical Center, and Marshfield Clinic (Wisconsin)—in August. Its application for membership, submitted in November 2010, was among those of more than 10 health systems/hospital centers competing for two available slots. New York's Mount Sinai Medical Center was the other new institution accepted for membership this summer.

The cornerstone of Geisinger's application was the MyCode® biobank, a large-scale project through which Geisinger researchers collect and store blood and tissue samples from Geisinger patients who have volunteered to participate in the program. According to David J. Carey, PhD, director of the Weis Center for Research, the goal of MyCode is to leverage Geisinger's large patient base and state-of-the-art electronic medical records (EMR) system to create a repository of patient samples (linkable to clinical data in the EMR system) for medical research. To date, 35,000 patients have volunteered to participate.

"Obviously, this is a national endorsement of Geisinger's leadership as an innovator in

the use of HIT and as an early adopter of EMR technology," said Dr. Ledbetter. "We also have built an enterprise-wide clinical data warehouse that leverages patient data—clinical, operational, and financial—to create what is called a 'learning health care system,' one that can monitor its own quality and performance and identify ways to improve patient care. Ultimately, what sets us apart is our ability to integrate large-scale genotypic and phenotypic data with EMR. Now the question is, how do we take genetic data, capture it in a patient's health record, use it to investigate what therapies are most effective, and identify the best way to implement these interventions?"

To date, the eMERGE Network already has identified genetic variants that are associated with a higher risk for dementia, cataracts, peripheral arterial disease, and type 2 diabetes, among other health conditions. Over the next 4 years, eMERGE investigators will identify genetic variants associated with up to 40 disease phenotypes. At Geisinger, researchers working in the GeM program will focus on obesity and abdominal aortic aneurysms. "As part of the MyCode project, we have been looking at genetic markers of obesity and abdominal aortic aneurysms for some time," said Dr. Carey.

Of the \$25 million total funding for the eMERGE program, Geisinger's GeM program will receive \$3.3 million over 4 years from NIH's National Human Genome Research Institute. Drs. Ledbetter and Carey will co-direct the GeM program, which will be carried out by an interdisciplinary team of scientists and clinician-scientists. As internationally known scientists and researchers, Drs. Ledbetter and Carey are uniquely qualified to lead the GeM program. They are committed to Geisinger's research focus on personalized health and the use of EMR to advance the GeM mission

of discovering genetic risk factors and translating the information into clinically useful genetic tests for early diagnosis and improved intervention. Other key members of the GeM team at Geisinger include HIT experts (James Walker, MD and Jonathan Darer, MD, MPH), human geneticists (Glenn Gerhard, MD; Helena Kuivaniemi, MD, PhD; and Gerard Tromp, PhD), and genetic counselors (Andrew Faucett and Bethanny Smith-Packard). Supporting collaborations for the GeM program have been established with the statistical genetics group at Case Western Reserve University (led by Robert Elston, PhD) and the University of Maryland (led by Alan Shuldiner, MD). Richard Sharp, PhD, director, bioethics research, Cleveland Clinic, and Joan Scott from the National Coalition for Health Professional Education in Genetics will serve as consultants.

"Geisinger's participation in the eMERGE program really sets us apart as a research institution nationally," said Dr. Carey. "As one of seven health systems in the program, we are in a unique position to share and access genetic data on hundreds of thousands of patients. This relationship makes us a leader in genetic research and helps in our efforts to find genetic relationships to diseases and identify improved measures for diagnosis and treatment."

"A patient's genomic profile information is the key to being able to individualize and optimize treatment," added Dr. Ledbetter. "Genomics is one of the keys to the future of medicine. The goal is to enable physicians to make a genomic-informed decision on the choice of drug therapy or other therapeutic intervention that will work best for an individual patient. With our involvement in eMERGE, Geisinger is positioned to be a leader in these efforts, which will ultimately benefit our patients."

Staff Publications

These publications feature Geisinger employees as authors, with publication dates from September through November 2011. The Geisinger author's name is bolded. The listings below follow National Library of Medicine format.

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Geisinger's Unique Strengths to Advance Studies

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medicine research – as is the case with Geisinger's MyCode® project.

Acceptance into the eMERGE (Electronic Medical Records and Genomics) Network, a consortium of U.S. medical research

institutions established by the National Institutes of Health (NIH), recognizes Geisinger's contributions to research as well as its capability to continue to engage in significant genomic research that, in

time, will help fundamentally improve medical care in the United States. This issue of *Research Connections* takes a look at some important developments in genomics research at Geisinger.

Recent Awards

This list includes new awards and competitive renewals from external agencies and Geisinger's Clinic Research Fund from September through November 2011. To protect sponsors' confidential information, we omit dollar amounts for clinical trials and industry-sponsored agreements and some clinical trial listings. If an award is inadvertently overlooked, please forward the information to Richard Fogaley (rafogaley@geisinger.edu) for inclusion in the next issue.

George Argyropoulos, PhD

Weis Center for Research
Fibroblast Grown Factor 19 and Bile Acids in Type 2 Diabetes
Clinical Research Fund
\$20,000

William Azeredo, MD

Otolaryngology
Involvement of Middle Ear Muscles in Contralateral Suppression of Otoacoustic Emissions
Clinical Research Fund
\$1,100

James Blankenship, MD

Cardiology
TOTAL Pilot Trial - A randomized trial of routine aspiration Thrombectomy with PCI versus PCI Alone in patients with STEMI undergoing primary PCI
Population Health Research Institute
\$30,000

Joseph Blansfield, MD

Surgical Oncology
Multicenter Selective Lymphadenectomy Trial II (MSLT-II): A Phase III Multicenter Randomized Trial of Sentinel Lymphadenectomy and Complete Lymph Node Dissection versus Sentinel Lymphadenectomy Alone in Cutaneous Melanoma Patients with Molecular or Histopathological Evidence of Metastasis in the Sentinel Node
NIH
\$292,500

James Brady, MD

Oncology
Studying Interventions for managing patients with chronic myeloid leukemia in chronic phase: The 5-Year prospective cohort study (SIMPLICITY)
Bristol-Myers Squibb

David Carey, PhD

Weis Center for Research

David Ledbetter, PhD

Genomic Medicine Institute
Geisinger Egenomic Medicine (GEM) Program
NIH
\$3,279,226

Kyo Chu, MD

Surgical Oncology
A Phase III, Randomized Trial of Surgical Resection With or Without BCG Versus Best Medical Therapy as Initial Treatment in Stage IV Melanoma
NIH
\$167,000

Gopi Dandamudi, MD

Cardiology
The Vest Prevention of Early Sudden Death Trial (VEST)
University of California
\$17,125

William DiFillipo

Nephrology
FSGS Associated with Chromosome 11: Identification of a New Translocation
Clinic Research Fund
\$8,000

Andy Faucett, MS, CGC

Genomic Medicine Institute
Weis Genealogy Program
Weis Family Foundation
\$100,000

Scott Gallagher

Diversified Services
Section 5310 Pennsylvania Department of Transportation Grant
Pennsylvania Department of Transportation
\$96,320

Amir Kenshenovich, MD

Neurosurgery
Development of a Prototype Orthotic Head Cushion for Correction and Prevention of Positional Plagiocephaly
Clinical Research Fund
\$20,000

Joshua Liberman

Center for Health Research
Reducing Rates of Primary Medication Non-Adherence: The Role of the Pharmacists Alone and in Collaboration with Physicians
Brigham and Women's Hospital (National Association of Chain Drug Stores Foundation)
\$143,757

Anne Moon, MD, PhD

Weis Center for Research
Generating Swine Models of Congenital Heart Defects for Basic and Translational Research
Clinical Research Fund
\$98,867

John Nash, MD

Oncology
A Phase II, Single-Arm Study of Orally Administered BKM120 as Second-Line Therapy in Patients with Advanced Endometrial Carcinoma
Novartis Pharmaceuticals Corporation

Thomas Scott, DO

William DiFillipo, MD

Cardiology
Renal Denervation in Patients with Uncontrolled Hypertension (HTN-3) (Protocol IP125)
Medtronic Vascular, Inc.

Deepak Singh, MD

Cardiology
Interagency Registry of Mechanically Assisted Circulatory Support
NIH

Steven Toms, MD

NeuroSurgery
The Ivy Glioblastoma Project: A Multi-site Initiative to Create a Web-based Resource for Glioblastoma Research
Ben and Catherine Ivy Foundation and the Swedish Medical Center Foundation
\$49,000

Pugazhendhi Vijayaraman, MD

Cardiology
Catheter Ablation Versus Anti-arrhythmic Drug Therapy for Atrial Fibrillation Trial
NIH
\$82,038