

# Final Progress Report for Research Projects Funded by Health Research Grants

Instructions: Please complete all of the items as instructed. Do not delete instructions. Do not leave any items blank; responses must be provided for all items. If your response to an item is “None”, please specify “None” as your response. “Not applicable” is not an acceptable response for any of the items. There is no limit to the length of your response to any question. Responses should be single-spaced, no smaller than 12-point type. The report **must be completed using MS Word**. Submitted reports must be Word documents; they should not be converted to pdf format. Questions? Contact Health Research Program staff at 717-231-2825.

1. **Grantee Institution:** The Pennsylvania State University
2. **Reporting Period (start and end date of grant award period):** 1/1/2011 - 12/31/2014
3. **Grant Contact Person (First Name, M.I., Last Name, Degrees):** John Anthony, MPA
4. **Grant Contact Person’s Telephone Number:** 814 935 1081
5. **Grant SAP Number:** 4100054865
6. **Project Number and Title of Research Project:** 1. Research Infrastructure Renovation to Create the Penn State Center for Translational Informatics
7. **Start and End Date of Research Project:** 1/1/2011 – 12/31/2014
8. **Name of Principal Investigator for the Research Project:** Richard Rauscher, MS
9. **Research Project Expenses.**

9(A) Please provide the total amount of health research grant funds spent on this project for the entire duration of the grant, including indirect costs and any interest earned that was spent:

\$ \$1,813,177.93

9(B) Provide the last names (include first initial if multiple individuals with the same last name are listed) of **all** persons who worked on this research project and were supported with health research funds. Include position titles (Principal Investigator, Graduate Assistant, Post-doctoral Fellow, etc.), percent of effort on project and total health research funds expended for the position. For multiple year projects, if percent of effort varied from year to year, report in the % of Effort column the effort by year 1, 2, 3, etc. of the project (x% Yr 1; z% Yr 2-3).

Last Name, First Name	Position Title	% of Effort on Project		Cost
Robertson, Jim	Systems Analyst	2012-2013	57%	\$40,184.12
		2013-2014	81.3%	\$57,468.16
		2014-2015	33.0%	\$23,823.40
DiStefano, William	Decision Support Analyst	2012-2013	15.5%	\$ 9,910.83
		2013-2014	20.4%	\$ 4,290.98
Crandall, Charles	Programmer Analyst	2013-2014	66.8%	\$14,671.16
		2014-2015	19.9%	\$10,296.96
Graybill, Marie	Research Project Manager	2012-2013	74.3%	\$47,997.00
		2013-2014	93.9%	\$61,849.2
		2014-2015	32.5%	\$21,964.00
Rauscher, Laura	Research Data Management Specialist	2013-2014	54.3%	\$12,316.00
		2014-2015	56.3%	\$13,670.00

9(C) Provide the names of **all** persons who worked on this research project, but who *were not* supported with health research funds. Include position titles (Research Assistant, Administrative Assistant, etc.) and percent of effort on project. For multiple year projects, if percent of effort varied from year to year, report in the % of Effort column the effort by year 1, 2, 3, etc. of the project (x% Yr 1; z% Yr 2-3).

Last Name, First Name	Position Title	% of Effort on Project
Rauscher, Richard	Principal Investigator	< 1%

9(D) Provide a list of **all** scientific equipment purchased as part of this research grant, a short description of the value (benefit) derived by the institution from this equipment, and the cost of the equipment.

Type of Scientific Equipment	Value Derived	Cost
Clinical Trials Management System software package	Track and manage Clinical Trials	\$1,013,551
Polycom RealPresence Immersive Theater system	Virtual meeting environment to facilitate collaboration	\$170,226

**10. Co-funding of Research Project during Health Research Grant Award Period.** Did this research project receive funding from any other source during the project period when it was supported by the health research grant?

Yes \_\_\_\_\_ No X \_\_\_\_\_

If yes, please indicate the source and amount of other funds:

**11. Leveraging of Additional Funds**

11(A) As a result of the health research funds provided for this research project, were you able to apply for and/or obtain funding from other sources to continue or expand the research?

Yes \_\_\_\_\_ No X \_\_\_\_\_

If yes, please list the applications submitted (column A), the funding agency (National Institutes of Health—NIH, or other source in column B), the month and year when the application was submitted (column C), and the amount of funds requested (column D). If you have received a notice that the grant will be funded, please indicate the amount of funds to be awarded (column E). If the grant was not funded, insert “not funded” in column E.

Do not include funding from your own institution or from CURE (tobacco settlement funds). Do not include grants submitted prior to the start date of the grant as shown in Question 2. If you list grants submitted within 1-6 months of the start date of this grant, add a statement below the table indicating how the data/results from this project were used to secure that grant.

A. Title of research project on grant application	B. Funding agency (check those that apply)	C. Month and Year Submitted	D. Amount of funds requested:	E. Amount of funds awarded:
None	<input type="checkbox"/> NIH <input type="checkbox"/> Other federal (specify: _____) <input type="checkbox"/> Nonfederal source (specify: _ )		\$	\$

11(B) Are you planning to apply for additional funding in the future to continue or expand the research?

Yes \_\_\_\_\_ No X \_\_\_\_\_

If yes, please describe your plans:

This project will not apply for other funding itself, but resources provided by this project will lead to many other successful award proposals in the future.

**12. Future of Research Project.** What are the future plans for this research project?

This Center for Translational Informatics and Clinical Trials Management System (CTMS) project have been met with a lot of excitement from clinical researchers, research coordinators, project managers and clinical trials office staff. The currently open studies are being rolled into this system to allow for better management and new studies are going to be

started in the system. Effort in supporting requests to mine the Electronic Medical Records are continuing successfully as well. Numerous projects have been completed in the previous years and many more are in progress. The number of data requests to mine our institution's EMR keeps increasing. The projects cross various traditional medical boundaries for collaborations and are paving the way for improved innovations in research methodologies and care outcomes.

**13. New Investigator Training and Development.** Did students participate in project supported internships or graduate or post-graduate training for at least one semester or one summer?

Yes \_\_\_\_\_ No X \_\_\_\_\_

If yes, how many students? Please specify in the tables below:

	Undergraduate	Masters	Pre-doc	Post-doc
Male				
Female				
Unknown				
<b>Total</b>				

	Undergraduate	Masters	Pre-doc	Post-doc
Hispanic				
Non-Hispanic				
Unknown				
<b>Total</b>				

	Undergraduate	Masters	Pre-doc	Post-doc
White				
Black				
Asian				
Other				
Unknown				
<b>Total</b>				

**14. Recruitment of Out-of-State Researchers.** Did you bring researchers into Pennsylvania to carry out this research project?

Yes \_\_\_\_\_ No X \_\_\_\_\_

If yes, please list the name and degree of each researcher and his/her previous affiliation:

**15. Impact on Research Capacity and Quality.** Did the health research project enhance the quality and/or capacity of research at your institution?

Yes   X   No \_\_\_\_\_

If yes, describe how improvements in infrastructure, the addition of new investigators, and other resources have led to more and better research.

Penn State has been engaged in a decade-long mission of removing barriers to translational research by creating targeted pathways to unify traditional information technology (IT) and biomedical informatics through systems and services that merge scholarly activity with production delivery, and by forming interdisciplinary centers that transcend departmental, college, and campus boundaries to seed new collaborative research directions and provide shared research infrastructure and instrumentation. The Center for Translational Informatics (CTI) will forge a systematic, multi-thematic effort toward sustainable pathways for translational research by leveraging existing strengths and latent synergies between basic science and translational research to reach new milestones at the confluence of (1) genomics and biomedical research; and (2) informatics and clinical best practices. The Clinical Trials Management System along with the CTI are increasing the efficiency of research and thereby increasing the capacity of research at the Penn State Hershey campus. In the case of the CTMS, the tracking and management aspects of the system allow for the improved oversight of clinical research studies that reduces errors and improves the quality of research going on at Penn State Hershey.

**16. Collaboration, business and community involvement.**

16(A) Did the health research funds lead to collaboration with research partners outside of your institution (e.g., entire university, entire hospital system)?

Yes \_\_\_\_\_ No   X  

If yes, please describe the collaborations:

16(B) Did the research project result in commercial development of any research products?

Yes \_\_\_\_\_ No   X  

If yes, please describe commercial development activities that resulted from the research project:

16(C) Did the research lead to new involvement with the community?

Yes \_\_\_\_\_ No   X

If yes, please describe involvement with community groups that resulted from the research project:

### **17. Progress in Achieving Research Goals, Objectives and Aims.**

List the project goals, objectives and specific aims (as contained in the grant agreement). Summarize the progress made in achieving these goals, objectives and aims for the period that the project was funded (i.e., from project start date through end date). Indicate whether or not each goal/objective/aim was achieved; if something was not achieved, note the reasons why. Describe the methods used. If changes were made to the research goals/objectives/aims, methods, design or timeline since the original grant application was submitted, please describe the changes. Provide detailed results of the project. Include evidence of the data that was generated and analyzed, and provide tables, graphs, and figures of the data. List published abstracts, poster presentations and scientific meeting presentations at the end of the summary of progress; peer-reviewed publications should be listed under item 20.

This response should be a DETAILED report of the methods and findings. It is not sufficient to state that the work was completed. Insufficient information may result in an unfavorable performance review, which may jeopardize future funding. If research findings are pending publication you must still include enough detail for the expert peer reviewers to evaluate the progress during the course of the project.

Health research grants funded under the Tobacco Settlement Act will be evaluated via a performance review by an expert panel of researchers and clinicians who will assess project work using this Final Progress Report, all project Annual Reports and the project's strategic plan. After the final performance review of each project is complete, approximately 12-16 months after the end of the grant, this Final Progress Report, as well as the Final Performance Review Report containing the comments of the expert review panel, and the grantee's written response to the Final Performance Review Report, will be posted on the CURE Web site.

**There is no limit to the length of your response. Responses must be single-spaced below, no smaller than 12-point type. If you cut and paste text from a publication, be sure symbols print properly, e.g., the Greek symbol for alpha ( $\alpha$ ) and beta ( $\beta$ ) should not print as boxes ( $\square$ ) and include the appropriate citation(s). DO NOT DELETE THESE INSTRUCTIONS.**

The formation of the Center for Translational Informatics (CTI) will accelerate the translation of life sciences and informatics advances into improved human health and community well-being by developing sustainable pathways for effective knowledge exchange across translational boundaries. It will also establish new collaborations at the intersections of existing successful programs to catalyze translational innovation, and develop integrative cyber-infrastructure (including software services, data warehousing, standards and policies) for accelerated bench-to-bedside applications of data-driven discoveries and processes. The CTI will achieve these goals through the following specific aims:

*Specific Aim 1: Renovate existing space to create the CTI and create the computational infrastructure to support genomics and clinical research at Penn State.*

The proposed project will renovate existing space within the General Clinical Research Center at the Penn State College of Medicine to create an office for the Director, Dr. Istvan Albert, and a collaborative space to house informaticists, data analysts, and IT analysts where they can interact with researchers to address their computational needs. The renovated space will include consultation space where support staff can interact with researchers for training in software use, data modeling, terminology, large-scale data management and analysis, human subject protections, biostatistics, bioethics, and research methodologies.

While the Specific Aims of the Strategic Plan of this project remain unchanged, a few modifications in how these aims were carried out had been made, as stated in the annual reports. The PI of this project was changed to Richard Rauscher, MS, Director of Research Informatics and Computing at the Penn State College of Medicine. In addition, Istvan Albert has been replaced by Arthur Berg, PhD, of the Bioinformatics Program of the Clinical and Translational Science Institute and an Associate Professor of Public Health Sciences. This serves to align the missions and goals of these respective entities. As a result of these staffing changes, it was decided to locate the CTI within an institutional space that brings together resources that support genomics and personalized medicine research.

Specific aim 1 has been achieved successfully. Renovations to create a shared institutional space that co-localizes shared resources and instrumentation in drug discovery and delivery and genome sciences, the Penn State Hershey biorepository, and researchers conducting research into personalized medicine are complete. The location now houses the drug discovery, development and delivery section, genome sciences division, Penn State Hershey biorepository and the Center for Translational Informatics. All the sections other than the CTI have been built in part using NIH funds. A bioinformatician, Ms. Anna Salzberg, has been recruited and currently occupies C2706C. The CTI director, Dr. Arthur Berg and Ms. Salzberg meet with researchers in her office or the other CTI consulting spaces. These are C2706 A, B and C and C2705F in Figure 1. The proximity of the two scientists allows for researchers who are interested in getting help with analyzing their genetic data. As such, Dr. Berg and Ms. Salzberg have collaborated with researchers on numerous papers and grants. We have also successfully recruited Dr. Feng Yue, an Associate Professor of Bioinformatics for the CTI. The institution has also recruited Dajiang Liu, PhD, a Biostatistics Professor, to work with Dr. Arthur Berg and Ms. Anna Salzberg in analyzing genetic data for our researchers. He is located in the CTI consulting space as designed and he and his colleagues have assisted numerous researchers in the genomic analyses of the various projects taking place here. By grouping these facilities together, the individuals providing these services will be able to network and collaborate most effectively.

Renovations have also included the creation of a virtual meeting environment allowing high-quality voice and video collaboration using a Polycom RealPresence Immersive Theater system. This has bridged researchers from the Hershey and University Park campuses of Penn State to foster greater collaborations in the areas of genomic science and personalized health. The Polycom RealPresence virtual meeting space to facilitate the discussion of scientific projects and allow for the cross campus collaborations between scientists, has been purchased and installed in

a dedicated room (C2704 in Figure 1). Project collaborations have taken place and during the inauguration of the Institute for Personalized Medicine, Ms. Salzberg gave a presentation regarding translational informatics and answered questions from the various attendees from another conference room on campus. (Figure 2) The attendees noted the clarity and features that allow for simple ways to show and explain complicated information.

The Polycom RealPresence system has also made it extremely convenient to collaborate and have discussions with strategic intercampus groups like the Health Sciences Council based out of University Park, Clinical and Translational Sciences Institute (CTSI) function leaders, CTSI, staff, etc. The robustness of the system allows in depth analysis of multiple types of data at the same time with ease. Some of the uses include monthly 2 hour meetings (September through June) with the Health Sciences Council at University Park, Clinical and Translational Sciences Institute update meetings with key function leaders (about 7 meetings a quarter), CTSI Staff meetings monthly with University Park, about 10 review meetings annually, and approximately 30 education meetings per annum. These meetings have improved the communications and collaborations in science between both campuses.

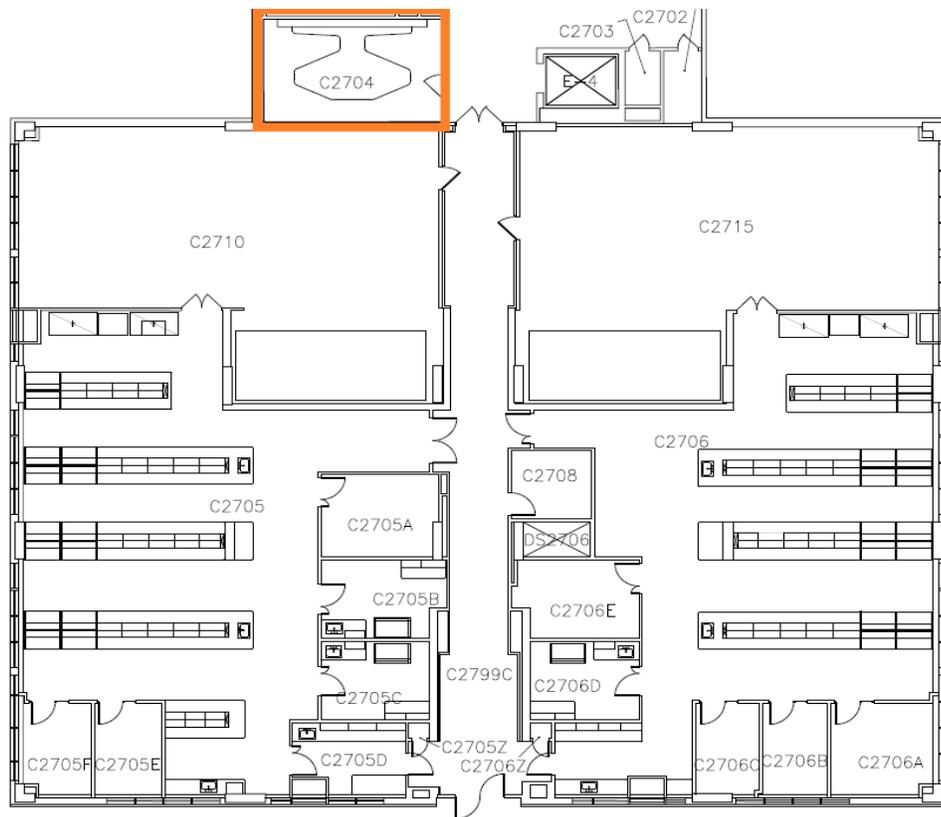


Figure 1. Floor plan of the Institute for Personalized Medicine showing the addition of the Polycom RealPresence room C2704



Figure 2. Anna Salzburg explaining Translational Informatics to attendees through the Polycom system.

The CTI is being frequently utilized by the researchers and staff of Penn State College of Medicine to further research analysis and collaborations. Analyses ranging from statistical genetics to longitudinal studies have occurred and the individual offices allow the staff to meet with the researchers and research groups as needed. The volume of studies being funneled through the CTI for analytical and statistical direction has increased, acknowledging the fact that this was a resource greatly needed by the institution.

*Specific Aim 2: Support clinical research by assisting researchers in the management and analysis of complex biological and clinical data by purchasing new software and hardware.*

The CTI will purchase software and hardware to allow researchers to conduct large-clinical trials more efficiently, analyze genomic data, keep clinical data secure and private, move large amounts of data more easily, and access the electronic medical records of patients to promote research in comparative effectiveness and personalized medicine.

1) Conduct of Clinical Research

The Clinical Trials Management System (CTMS) package has been purchased from Click Commerce. Implementation of the package and creation of the primary interfaces necessary to update current trial information automatically was just recently completed. This system allows research coordinators to manage the data of a clinical study (therapeutic, observational, outcomes, or epidemiological), and provides an interface for data capture. The CTMS will also assist coordinators with maintaining and managing clinical trial planning, preparation, performance, tracking, and reporting. Staff are able to input data remotely, which is useful for multicenter studies or studies that recruit patients from community physician and clinic practice sites. All investigators conducting clinical studies at the Penn State College of Medicine or Hershey Medical Center will be

expected to utilize the new system. The integration between Penn State's Institutional Review Board and CTMS is complete and has been tested to make sure that the cross communication and data transfer is seamless. This allows for a one-stop shop for the study coordinators to verify if the clinical study has Institutional Review Board (IRB) approval to consent patients.

The CTMS system was rolled out in December 2014, 30 studies are in the process of being added to the system and are in varying stages of entry and review. The staff are in the process of adding the currently open studies to the system. Once all the studies are fully inputted, the CTMS system will serve as a repository of all applicable studies in which there are items and services billable to a sponsor, payer or individual. By identifying these items and services for each specific study, the research team can appropriately mark those items as completed, aiding in appropriate and compliant research billing. The financial status for each study will be tracked real time (and accessible by the study team) and managed by one of the central post-award staff. These will greatly improve efficiencies as processes are standardized across the institution. Another advantage that is being seen is that the system allows for real time enrollment of participants so at any time the study team can view progress towards enrollment goals and the status of each participant in the study. The CTMS is integrated with our IRB system, Centralized Application Tracking System (CATS), and serves as a central repository for most all study-related documents decreasing the potential for study team members not to have access to the appropriate documents or use outdated documents. This reduces the risk borne by the institution from a regulatory standpoint.

## 2) Comparative Effectiveness Research

Our decision support analyst meets with researchers on a consistent basis to discuss efficient methods to query records and to analyze and present the relevant data. Being able to effectively identify and analyze the information is essential for the personalized medicine research that Penn State is focusing on.

Effort in supporting requests to mine the Electronic Medical Records are continuing successfully. Numerous projects have been completed in the previous years and many more are in progress. The range of studies span from pain endurance, and acute cardiological syndromes to studies in pediatric nephrology cases. The number of data requests to mine our institution's EMR keeps increasing. The projects cross various traditional medical boundaries for collaborations and are paving the way for improved innovations in research methodologies and care outcomes.

## 3) Analysis of Genetic Data

There is an increasing emphasis on genomic and personalized medicine research in the institution. Funded in part by an NIH grant, Penn State Hershey has recently inaugurated the Institute for Personalized Medicine (IPM). The IPM houses cores like the Drug Discovery, Development, and Delivery Core facility led by Kent Vrana, PhD, and the Genome Sciences facility, led by Willard Freeman, PhD. Foreseeing a need for bioinformatical and statistical analysis for researchers who are going to be involved in

personalized medicine and other genomic research, the decision was made to house the CTI within the IPM. This foresight and the resulting strategic advantage are paying off. Researchers have approached the CTI in order to access the expertise and technology that is present for various research projects. Some of these published projects include analysis of alternative splicing and gene expression microarrays for the study of diet-induced alternative splicing using the CLC Genomics Workbench package; performing microarray analysis on oxidative stress in young girls and the link to breast cancer; performing analyses pathway and haplotype analysis and ENCODE data analysis. Other projects include studies on demethylation, transcriptome studies for fiber transition, metabolomic reprogramming and genetic influences on Vitamin D associated protein concentrations.

To summarize, the project has allowed the institution to improve the clinical trials and genomic research processes and output. The various stakeholders like the faculty, research coordinators and administrative staff have the tools necessary to better perform their research duties and provide data that improves the overall health of the public in the Commonwealth of Pennsylvania.

**18. Extent of Clinical Activities Initiated and Completed.** Items 18(A) and 18(B) should be completed for all research projects. If the project was restricted to secondary analysis of clinical data or data analysis of clinical research, then responses to 18(A) and 18(B) should be “No.”

18(A) Did you initiate a study that involved the testing of treatment, prevention or diagnostic procedures on human subjects?

Yes  
 No

18(B) Did you complete a study that involved the testing of treatment, prevention or diagnostic procedures on human subjects?

Yes  
 No

**If “Yes” to either 18(A) or 18(B), items 18(C) – (F) must also be completed.** (Do NOT complete 18(C-F) if 18(A) and 18(B) are both “No.”)

18(C) How many hospital and health care professionals were involved in the research project?

\_\_\_\_\_ Number of hospital and health care professionals involved in the research project

18(D) How many subjects were included in the study compared to targeted goals?

\_\_\_\_\_ Number of subjects originally targeted to be included in the study  
\_\_\_\_\_ Number of subjects enrolled in the study

**Note:** Studies that fall dramatically short on recruitment are encouraged to provide the details of their recruitment efforts in Item 17, Progress in Achieving Research Goals, Objectives and Aims. For example, the number of eligible subjects approached, the number that refused to participate and the reasons for refusal. Without this information it is difficult to discern whether eligibility criteria were too restrictive or the study simply did not appeal to subjects.

18(E) How many subjects were enrolled in the study by gender, ethnicity and race?

Gender:

\_\_\_\_\_ Males  
\_\_\_\_\_ Females  
\_\_\_\_\_ Unknown

Ethnicity:

\_\_\_\_\_ Latinos or Hispanics  
\_\_\_\_\_ Not Latinos or Hispanics  
\_\_\_\_\_ Unknown

Race:

\_\_\_\_\_ American Indian or Alaska Native  
\_\_\_\_\_ Asian  
\_\_\_\_\_ Blacks or African American  
\_\_\_\_\_ Native Hawaiian or Other Pacific Islander  
\_\_\_\_\_ White  
\_\_\_\_\_ Other, specify: \_\_\_\_\_  
\_\_\_\_\_ Unknown

18(F) Where was the research study conducted? (List the county where the research study was conducted. If the treatment, prevention and diagnostic tests were offered in more than one county, list all of the counties where the research study was conducted.)

**19. Human Embryonic Stem Cell Research.** Item 19(A) should be completed for all research projects. If the research project involved human embryonic stem cells, items 19(B) and 19(C) must also be completed.

19(A) Did this project involve, in any capacity, human embryonic stem cells?

\_\_\_\_\_ Yes  
 X  No

19(B) Were these stem cell lines NIH-approved lines that were derived outside of Pennsylvania?

\_\_\_\_\_ Yes

\_\_\_\_\_ No

19(C) Please describe how this project involved human embryonic stem cells:

**20. Articles Submitted to Peer-Reviewed Publications.**

20(A) Identify all publications that resulted from the research performed during the funding period and that have been submitted to peer-reviewed publications. Do not list journal abstracts or presentations at professional meetings; abstract and meeting presentations should be listed at the end of item 17. **Include only those publications that acknowledge the Pennsylvania Department of Health as a funding source** (as required in the grant agreement). List the title of the journal article, the authors, the name of the peer-reviewed publication, the month and year when it was submitted, and the status of publication (submitted for publication, accepted for publication or published.). Submit an electronic copy of each publication or paper submitted for publication, listed in the table, in a PDF version 5.0.5 (or greater) format, 1,200 dpi. Filenames for each publication should include the number of the research project, the last name of the PI, and an abbreviated title of the publication. For example, if you submit two publications for Smith (PI for Project 01), one publication for Zhang (PI for Project 03), and one publication for Bates (PI for Project 04), the filenames would be:

Project 01 – Smith – Three cases of isolated

Project 01 – Smith – Investigation of NEB1 deletions

Project 03 – Zhang – Molecular profiling of aromatase

Project 04 – Bates – Neonatal intensive care

If the publication is not available electronically, provide 5 paper copies of the publication.

**Note:** The grant agreement requires that recipients acknowledge the Pennsylvania Department of Health funding in all publications. Please ensure that all publications listed acknowledge the Department of Health funding. If a publication does not acknowledge the funding from the Commonwealth, do not list the publication.

Title of Journal Article:	Authors:	Name of Peer-reviewed Publication:	Month and Year Submitted:	Publication Status (check appropriate box below):
1. None				<input type="checkbox"/> Submitted <input type="checkbox"/> Accepted <input type="checkbox"/> Published

20(B) Based on this project, are you planning to submit articles to peer-reviewed publications in the future?

Yes \_\_\_\_\_ No X \_\_\_\_\_

If yes, please describe your plans:

This project by itself has not lead to any publications, but availability to these facilities will contribute to innumerable publications in the future.

**21. Changes in Outcome, Impact and Effectiveness Attributable to the Research Project.**

Describe the outcome, impact, and effectiveness of the research project by summarizing its impact on the incidence of disease, death from disease, stage of disease at time of diagnosis, or other relevant measures of outcome, impact or effectiveness of the research project. If there were no changes, insert "None"; do not use "Not applicable." Responses must be single-spaced below, and no smaller than 12-point type. DO NOT DELETE THESE INSTRUCTIONS. There is no limit to the length of your response.

None

**22. Major Discoveries, New Drugs, and New Approaches for Prevention Diagnosis and Treatment.**

Describe major discoveries, new drugs, and new approaches for prevention, diagnosis and treatment that are attributable to the completed research project. If there were no major discoveries, drugs or approaches, insert "None"; do not use "Not applicable." Responses must be single-spaced below, and no smaller than 12-point type. DO NOT DELETE THESE INSTRUCTIONS. There is no limit to the length of your response.

None

**23. Inventions, Patents and Commercial Development Opportunities.**

23(A) Were any inventions, which may be patentable or otherwise protectable under Title 35 of the United States Code, conceived or first actually reduced to practice in the performance of work under this health research grant? Yes \_\_\_\_\_ No X

If "Yes" to 23(A), complete items a – g below for each invention. (Do NOT complete items a - g if 23(A) is "No.")

a. Title of Invention:

b. Name of Inventor(s):

c. Technical Description of Invention (describe nature, purpose, operation and physical, chemical, biological or electrical characteristics of the invention):

- d. Was a patent filed for the invention conceived or first actually reduced to practice in the performance of work under this health research grant?  
Yes\_\_\_\_\_ No\_\_\_\_

If yes, indicate date patent was filed:

- e. Was a patent issued for the invention conceived or first actually reduced to practice in the performance of work under this health research grant?  
Yes\_\_\_\_\_ No\_\_\_\_

If yes, indicate number of patent, title and date issued:

Patent number:

Title of patent:

Date issued:

- f. Were any licenses granted for the patent obtained as a result of work performed under this health research grant? Yes\_\_\_\_\_ No\_\_\_\_

If yes, how many licenses were granted?\_\_\_\_\_

- g. Were any commercial development activities taken to develop the invention into a commercial product or service for manufacture or sale? Yes\_\_\_ No\_\_\_\_

If yes, describe the commercial development activities:

23(B) Based on the results of this project, are you planning to file for any licenses or patents, or undertake any commercial development opportunities in the future?

Yes\_\_\_\_\_ No\_\_\_X\_\_\_\_\_

If yes, please describe your plans:

**24. Key Investigator Qualifications.** Briefly describe the education, research interests and experience and professional commitments of the Principal Investigator and all other key investigators. In place of narrative you may insert the NIH biosketch form here; however, please limit each biosketch to 1-2 pages.

## BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors in the order listed on Form Page 2.  
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME <b>Richard Rauscher</b>	POSITION TITLE <b>Director of Research Informatics and Educational Computing</b>		
eRA COMMONS USER NAME (credential, e.g., agency login)			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
University of South Florida, Tampa, FL	MS	12/1996	Computer Science
Rutgers University, New Brunswick, NJ	BA	05/1991	Computer Science
Penn State University	PhD	In progress	Computer Science

### A. Personal Statement

Over the last twenty years, I have been a member of IT Leadership at four academic health centers with varying roles such as infrastructure engineer, bioinformatics core director, chief information officer and information security officer. Through this experience, I have become familiar with all aspects of providing support to scientists.

### B. Positions and Honors

1993-1995            Assistant In Engineering Computing, University of South Florida, Tampa, FL

1995-1999            Network/Systems Engineer, Moffitt Cancer Center at the University of South Florida, Tampa, FL

1999-2000            Senior Consultant, Computer Sciences Corporation, Wilmington, DE

2000-2003            Information Security Officer/Manager of Technology Architecture, Moffitt Cancer Center at University of South Florida, Tampa, FL

2003-2005            CIO/VP of IT and Biomedical Informatics, Karmanos Cancer Institute, Detroit, MI

2005-2010            Director of Information Technology, Penn State Milton S Hershey Med Center, Hershey, PA

2010-2011            Executive Director of Information Technology, Boston University, Boston MA

2011-                 Director of Research Informatics, Penn State Milton S Hershey Med Center, Hershey, PA

### C. Selected Peer-reviewed Publications

Rauscher, R., Acharya, R., 'A Network Security Architecture to Reduce the Risk of Data Leakage for Health Care Providers', Proceedings of the IEEE Healthcom 2014, Natal, Brazil, October 2014.

Rauscher, R., Acharya, R., 'Virtual Machine Placement in Predictable Computing Clouds', Proceedings of the 7<sup>th</sup> Annual Conference on Cloud Computing, Anchorage, Alaska, July 2014.

Rauscher, R., Acharya, R., 'Performance of Private Clouds in Health Care Organizations', Proceedings of the IEEE CloudCom 2013, Bristol, United Kingdom, December 2013.

Rauscher R., Proceedings of the 2012 IEEE Second International Conference on Healthcare Informatics, Imaging and Systems Biology, 'Cloud Computing Considerations for Biomedical Applications.', 2012.

Rauscher R, Acharya, R. Proceedings of the First Annual Combined AMA and IEEE Meeting. 'A Protocol for Long-Term Preservation of Trust in Electronic Health Records Constructed from Heterogeneous Source.' 2010.

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