



UserGateway BioGeoBank Application for Maine Institute for Human Genetics & Health

Improving cancer research for the region of Maine through
technological innovation

Background

The Maine Institute for Human Genetics and Health (MIHGH) is a translational research center engaged in exploratory clinical research. It acts as a catalyst for change in strategies to reduce the burden of chronic diseases, especially cancer, in rural healthcare.

Dr. Janet Hock, executive Director at MIHGH, is involved in research on how environmental attributes can affect the cancer research in Maine. Maine's population experiences one of the nation's highest cancer incidence rates in the US. According to the US Cancer Statistics report, Maine had a rate of 510.3 cases of cancer per 100,000 people. The known environmental risk for cancer includes exposures to radiation, metals and endocrine disrupting chemicals (EDCs).

The clinical system at MIHGH included functional areas such as subject enrollment, study/protocol management, form development, and specimen tracking. However, there was no system available for researchers to explore correlation between disease and the environment at a given moment in time and over a span of years. The institute was looking for a development partner to build an application which would allow researchers to analyze data in 3 dimensions: clinical, geographical and temporal.

Persistent was chosen for the engagement because of the domain and technology depth in clinical informatics and caBIG® along with strong working relationship with some of the best research institutes and medical centers.

MIHGH defined the following objectives for the bio-geo-bank application development:

- Build research infrastructure and conduct environmental oncology research to address health disparities in rural communities to provide a scientific basis for novel diagnostics and individual treatment of cancer patients
- Improve early diagnosis, prevention and prognosis of cancer by linking critical environmental exposures to genetic variations, adverse behaviors and lifestyle
- Develop a mapping application which can answer the questions about how the natural environment, manmade toxins and genetic factors are linked to the Maine state's cancer rate
- Invent new models to improve diagnosis and prognosis of chronic diseases, and enhance the ability to track emerging diseases, by integrating geographic information system (GIS), genealogy and social network data over space and time with electronic medical records and lifestyle data



Our experience with Persistent Systems has been very rewarding and highly collaborative. The company really works as a partner, and remains sensitive to timelines and budget by relying on excellent project management. Staff is very practical; they contribute suggestions that improve the quality and content of the software, and are readily available for discussions. We enjoy working with them.



*-Dr. Janet Hock,
Executive Director,
MIHGH*

The Persistent Solution

With a decade of experience in the field of Life Sciences and Healthcare, 8+ years of membership with caBIG® and expertise in end to end product development, Persistent developed a web based application with the following features:

- Query functionality - Spatiotemporal (location + time), Spatial join for environmental and non-environmental layers, Temporal join for environmental and non-environmental layers
- Export functionality - Export query results to predefined formats like CSV, XLS, Shape files, DBF, etc.
- Specimen distribution functionality - Specimen request on the basis of query resultant subset with administrative approvals
- Protocol Management
- User Management - Includes user registration, authentication and authorization

Over the course of engagement Persistent:

- Implemented a fully functional web based Bio-Geo-Bank for researchers to explore the correlation between disease and the environment at a given moment in time and over a span of years
- Integrated open source GIS to study the interactions between human susceptibility to disease, lifestyles and environmental exposures for more comprehensive assessment of human health risks across generations and geographic regions and over time
- Developed the solution using open source tools and a freeware technology stack to query the subject's data. The resultant of this query would be a map which would display the environmental layers along with the filtered subjects based on query criteria

The Results

The User Gateway software links the medical and social data with bio-specimens and the physical environment to develop novel models of personalized health risk assessment and human health for tissue repositories.

The application helped the client to:

- Enable spatial and temporal queries using geographic information system (GIS), thereby coupling environmental risk factors with genetic, clinical, and lifestyle data
- Understand the interactions between the environment and human health better, especially their cancer risks
- Develop a caBIG® compliant system
- Develop an application that is flexible in allowing oncology and other diverse disease data sets across different geographical regions
- Reduce costs in licensed software procurement because of our ability to work with open source stack

About Persistent Systems

Persistent Systems (BSE & NSE: PERSISTENT) builds software that drives our customers' business; enterprises and software product companies with software at the core of their digital transformation. For more information, please visit: www.persistent.com

India

Persistent Systems Limited
 Bhageerath, 402,
 Senapati Bapat Road
 Pune 411016.
 Tel: +91 (20) 6703 0000
 Fax: +91 (20) 6703 0009

USA

Persistent Systems, Inc.
 2055 Laurelwood Road, Suite 210
 Santa Clara, CA 95054
 Tel: +1 (408) 216 7010
 Fax: +1 (408) 451 9177
 Email: info@persistent.com



PERSISTENT