Name: Mary Feng
School: University of Iowa
Major: Statistics, Computer Science, and Mathematics
Current Classification: Senior
Mentors: Brajendra Singh, Sandra Gesing, and Jarek Nabrzyski

Project title: Science Gateway Development for Vector-borne Neglected Tropical Disease Control & Elimination

New skills acquired during summer research

- Web development
  - Before the summer, I had limited experience with HTML and CSS; I also had no experience with Javascript. Now, I am more comfortable with using HTML to add content to a page, using CSS to style a page, and using Javascript for interactivity. I am now more familiar with JQuery, Ajax, and web development overall.

- More familiarity with command line
  - Prior to this research experience, I wasn’t too familiar with using the command line interface. I knew basic commands to list directory files, move files, make/delete directories, but I didn’t have much experience with more complex things, and I had not used vim before. This summer has helped me be more familiar using the command line and also some tips and tricks.

- Knowledge of grid computing
  - This research experience has also taught me a lot about grid computing. I learned about schedulers, job execution, and more. Reading books and papers has helped me understand more about different resources and systems.

- Mathematical modeling
  - The project also gave me an example of a real world application of mathematical models for disease transmission and control. I learned about various model parameters, the Bayesian melding technique, and how modeling works in a practical sense.

Project Summary
There are various efforts to control and eradicate diseases throughout the world. For example, the World Health Organization (WHO) has published a roadmap to eliminating the 17 Neglected Tropical Diseases. Intervention methods may include mass drug administration, bednets, light traps, improving sanitation conditions, and more. Mathematical modeling helps to analyze various methods of controlling and eliminating diseases, along with the current status in the process of disease eradication. In order to make these mathematical models more accessible to the scientific community and other efforts for disease control, a web portal is desired. This would allow for easy access to using these models for many users. This science gateway was built with the Agave API, which already has features like job execution, system management, notifications, and more. Web development technologies including HTML5, CSS, and Javascript were used to build the portal. Methods like POST and GET were used to call various Agave services in the portal. Currently, the portal supports job execution, application selection, file input selection, and job polling. Future work includes functionalities to browse and download job output on the portal, using cloud resources, and implementing different views for different kinds of users.

- **Publications (papers/posters/presentations):**
  - Poster presentation at the Summer Undergraduate Research Symposium (SURS) at the University of Notre Dame on August 1, 2014