### University of Virginia (UVa) Statement of Work for “Analysis of Risk, Impact and Management Strategies for Current and Emerging Threats: *Parthenium hysterophorus* and *Drosophila Suzukii*”

#### Biocomplexity Institute and Initiative

The team from BII is headed by Abhijin Adiga and includes the following team members: Achla Marathe, Mandy Wilson, Anil Vullikanti and Madhav Marathe. This is a commissioned quick start project proposal, which is part of the proposal titled “Feed the Future Innovation Lab for Current and Emerging Threats to Crops Innovation Lab” in response to the notice of funding opportunity by USAID. Broadly, BII will contribute to the modeling efforts towards risk assessment, control and economic impact assessment of two invasive species *Parthenium hysterophorus* and *Drosophila suzukii*. The first goal of this project is to assess the ongoing biocontrol efforts for *P. hysterophorus* and develop efficient model-guided strategies to minimize the spread of the invasive plant*.* The second goal of this project is to assess the potential for establishment, spread, and economic impact of *Drosophila Suzukii* in Sub-Saharan Africa*.*The third goal is to develop a decision support system for data ingestion and dissemination of model results. Particular tasks include:

* Assist in developing species suitability maps using bioclimatic indicators for *P. hysterophorus* and its biocontrol agents (Goal 1 Objectives (i) and (ii)).
* Develop deep learning models for constructing species distribution maps using remote-sensed data (Goal 1 Objective (iii)).
* Analysis of species distribution maps and suitability maps for site-specific release of biocontrol agents (Goal 1 Objective (iv)).
* Identification of possible host fruit crops of *D. suzukii* in Africa. In this regard, production and trade data will be analyzed to identify pathway of spread (Goal 2 Objective (i)).
* Assistance in developing species suitability maps for *D. suzukii* (Goal 2 Objective (ii)).
* Economic impact assessment of *D. suzukii* invasion in Sub-Saharan Africa (Goal 2 Objective (iii)).
* Development of species distribution and surveillance web application, and integration with USAID Digital Development Library (Goal 3).
* Other significant tasks include:
* Mentoring the postdoctoral fellow and undergraduate students who will be funded by this project.
* Participating in regular team meetings.
* Write papers, prepare reports, and presentations
* Support outreach and education activities.