



# Evaluation Report

## Synthesizing and Predicting Infectious Disease While Accounting for Endogenous Risk (SPIDER) Working Group

June 7-9, 2009

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## Executive Summary

### Brief Synopsis of Event

This report is an evaluation of a NIMBioS Working Group entitled “Synthesizing and Predicting Infectious Disease While Accounting for Endogenous Risk,” (SPIDER) which held its first meeting at NIMBioS June 7-9, 2009. NIMBioS Working Groups are chosen to focus on major scientific questions at the interface between biology and mathematics. NIMBioS is particularly interested in questions that integrate diverse fields, require synthesis at multiple scales, and/or make use of or require development of new mathematical/computational approaches. NIMBioS Working Groups are relatively small (10-15 participants), focus on a well-defined topic, and have well-defined goals and metrics of success. Working Groups will typically meet 2-3 times over a two-year period, with each meeting lasting 3-5 days; however, the number of participants, number of meetings, and duration of each meeting is flexible, depending on the needs and goals of the group.

The SPIDER group comprised 14 participants, including organizers Eli Fenichel (Arizona State University), Peter Dazsak (Consortium for Conservation Medicine, NY), Rick Horan (Michigan State University), and Charles Perrings (Arizona State University). Participants came from a variety of other institutions, including the United States Department of Agriculture and several universities in the United States and the United Kingdom (See Appendix A).

The SPIDER Working Group brought together disease ecologists, economists, and mathematicians to facilitate the development of predictive models both to forecast the risks associated with EIDs in humans, livestock, wildlife, and plants, and to assist in the development of risk management strategies. The first meeting of the SPIDER Working Group facilitated work on feedback between human behavior and emerging infectious disease risk. The group is employing a network motif to organize research combined with cross-cutting themes. The network motif organizes research themes to within nodes (e.g., countries, regions, or localities), on edges or pathways between nodes, and as a complex system. Cross-cutting themes include uncertainty and learning and computational issues. Each sub-group is developing a working paper and material for a synthesis paper. The Working Group meets next in early November, 2009, when the group will address issues associated with connecting the different sub-groups for the synthesis paper, resolving technical difficulties, and computing results.

### Evaluation Design

An electronic survey aligned to the following evaluation questions was designed by NIMBioS' Evaluation Coordinator with input from the NIMBioS Director and Deputy Director:

1. Were participants satisfied with the Working Group overall?
2. Did the meeting meet participant expectations?
3. Do participants feel the Working Group made adequate progress toward its stated goals?
4. Do participants feel they gained knowledge about the main issues related to the research problem?
5. Do participants feel they gained a better understanding of the research across disciplines related to the Working Group's research problem?

6. What impact do participants feel the Working Group will have on their future research?
7. Were participants satisfied with the accommodations offered by NIMBioS?
8. What changes in accommodations, group format, and/or content would participants like to see at future meetings?

The final instrument was hosted online via the University of Tennessee's secure online survey host mriInterview. Links to the survey were sent to the 14 Working Group participants on June 10, 2009. Reminder emails were sent to non-responding participants on June 15 and 18, 2009. By June 28, 2009, 11 participants had given their feedback, for a response rate of 79%.

## Highlights of Results

- Overall satisfaction with the Working Group was high among survey respondents, all of whom indicated they either agreed or strongly agreed that the Working Group was very productive and met their expectations.
- All respondents thought the presentations were useful and all thought that the presenters were very knowledgeable about their presentation topics.
- All respondents either agreed or strongly agreed that they would recommend participating in NIMBioS Working Groups to their colleagues.
- Overall, respondents reported being satisfied with the travel, housing, and other amenities provided by NIMBioS.
- The majority (91%) of respondents agreed that they had a better understanding of the main issues related to SPIDER as a result of participating in the Working Group.
- Most respondents said the multidisciplinary composition of the Working Group was its most useful aspect.
- 100% of respondents agreed that the format of the Working Group was very effective for achieving its goals, and that the Working Group made adequate progress for the first meeting toward all of its goals.
- All respondents said they left this meeting with a good idea of what their contribution will be at the next meeting
- All respondents said they planned to take the knowledge they gained during the Working Group and apply it to their own research.
- All respondents reported they developed solid plans for collaborative research with other Working Group participants.

## Conclusions and Recommendations

Overall, the Working Group was very successful in making progress toward its goals. Working Group respondents were satisfied with the meeting, indicating that it was a productive experience that met their expectations. Respondents were also satisfied with the travel, housing, and other amenities offered by NIMBioS.

Respondents overall reported high levels of learning, agreeing that they had a better understanding of the main research issues. All respondents agreed that the Working Group format allowed the group to make adequate progress toward its goals of building the capacity to unify predictive models across disciplines and developing an interdisciplinary research agenda for modeling risks associated with EIDs. All respondents also said they left this meeting with a good idea of what their contribution will be at the next meeting.

All respondents indicated they planned to take the knowledge they gained during the Working Group and apply it to their own research, and that they had developed solid plans for collaborative research with other Working Group participants. The only suggestion for improvement offered by the participants was better coffee.

Based on analysis of participant response data, the recommendations are as follows:

- Participants were extremely satisfied with the working group content and format; no changes are needed in this area.
- The Working Group had a multidisciplinary composition, but consider trying to recruit a broader diversity of participants regarding gender and ethnicity.
- Consider providing participants with different coffee

# SPIDER Working Group Evaluation Report

## Background

### Introduction

The Synthesizing and Predicting Infectious Disease While Accounting for Endogenous Risk (SPIDER) comprised 14 participants, including organizers Eli Fenichel (Arizona State University), Peter Dazsak (Consortium for Conservation Medicine, NY), Rick Horan (Michigan State University), and Charles Perrings (Arizona State University). Participants came from a variety of other institutions, including the United States Department of Agriculture and several universities in the United States and the United Kingdom (See Appendix A).

NIMBioS Working Groups are chosen to focus on major scientific questions at the interface between biology and mathematics. NIMBioS is particularly interested in questions that integrate diverse fields, require synthesis at multiple scales, and/or make use of or require development of new mathematical/computational approaches. NIMBioS Working Groups are relatively small (10-15 participants), focus on a well-defined topic, and have well-defined goals and metrics of success. Working Groups will typically meet 2-3 times over a two-year period, with each meeting lasting 3-5 days; however, the number of participants, number of meetings, and duration of each meeting is flexible, depending on the needs and goals of the group.

The SPIDER Working Group brought together disease ecologists, economists, and mathematicians to facilitate the development of predictive models both to forecast the risks associated with EIDs in humans, livestock, wildlife, and plants, and to assist in the development of risk management strategies. The first meeting of the SPIDER Working Group facilitated work on feedback between human behavior and emerging infectious disease risk. The group is employing a network motif to organize research combined with cross-cutting themes. The network motif organizes research themes to within nodes (e.g., countries, regions, or localities), on edges or pathways between nodes, and as a complex system. Cross-cutting themes include uncertainty and learning and computational issues. Each sub-group is developing a working paper and material for a synthesis paper. The Working Group meets next in early November, 2009, when the group will address issues associated with connecting the different sub-groups for the synthesis paper, resolving technical difficulties, and computing results.

### Working Group Background

There is increasing interest in modeling risks associated with emerging infectious diseases (EIDs). Most EIDs are zoonotic in nature and many infect valuable livestock and wildlife resources. Disease risks, like the risks associated with invasive species, are endogenous – a function of human decisions. However, most current attempts to model EID risks treat risk as exogenous and intrinsic. This comes from implicitly assuming that the probability of an event and the human self-protection decisions are additively separable in the consequence function. In order to successfully manage, predict, and develop surveillance strategies for new emerging diseases, it is imperative that the human decision making processes that influence disease risks are formally included in the decision process. Recent

mathematical advances offer new opportunities to do so. The SPIDER Working Group brought together disease ecologists, economists, and mathematicians to facilitate the development of predictive models both to forecast the risks associated with EIDs in humans, livestock, wildlife, and plants.

### Participant Demographics

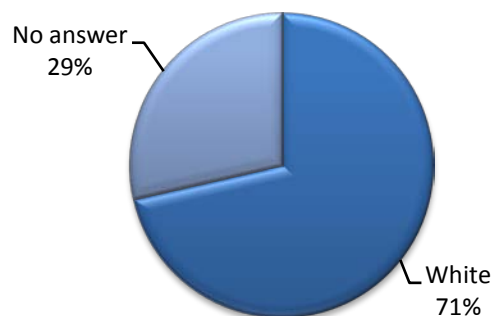
SPIDER participants, who were college/university faculty (79%), postdoctoral researchers (7%), non-profit organization employees (7%) or government employees (7%), came from 11 institutions across 10 states/counties in the United States and the United Kingdom. Included in these institutions were the United States Department of Agriculture, the Consortium for Conservation Medicine, NIMBioS, the University of Reading (United Kingdom), and several U.S. universities. Primary fields of study for the 14 participants included agricultural sciences/natural resources, biological/biomedical sciences, health sciences, mathematics, and social sciences (Table 1).

Table 1. *Participant fields of study and areas of concentration*

Field of Study	Concentration	# Participants
Agricultural Sciences/Natural Resources	Agricultural Economics	3
Biological/Biomedical Sciences	Ecology	1
	Mathematical Biology	1
	Zoology	1
Health Sciences	Public Health	1
Mathematics	Applied Mathematics	2
Social Sciences	Econometrics	1
	Econometrics	4

The 3 females and 11 males (three of whom self-identified as being of Hispanic/Latino ethnicity) mostly self-identified racially as white (Figure 1).

Figure 1. Racial composition of program participants (n =14)





Three respondents indicated their work is currently supported by a National Science foundation grant. One respondent indicated his/her work is supported by three separate grants, while another indicated receiving support from two separate grants (Table 2).

Table 2. *NSF grants supporting participant research*

Name of grant	Institution(s) at which grant is held
BESTNet	Arizona State University
Predicting Spatial Variation in West Nile Virus Transmission	
Human-related factors affecting emerging infectious diseases	
The Ecology, Emergence and Pandemic Potential of Nipah virus in Bangladesh	Wildlife Trust
High-Fidelity Site Characterization by Experimentation, Field observation, and Inversion-Base Modeling	Carnegie Mellon
Cyber-ShARE: Center for Sharing Cyber-Resources to Advance Research and Education	University of Texas, El Paso

## Evaluation Design

### Evaluation Questions

The evaluation of the Working Group was both formative and summative in nature, in that the data collected from participants was intended to both gain feedback from participants about the quality of the current Working Group and also to inform future meetings. The evaluation framework was guided by Kirkpatrick’s Four Levels of Evaluation model for training and learning programs (Kirkpatrick, 1994<sup>1</sup>). The evaluation questions were developed according to level one of the model, participants’ reactions, in order to gather information about how participants felt about the content and format of the Working Group, as well as the accommodations provided by NIMBioS. Several questions constituted the foundation for the evaluation:

1. Were participants satisfied with the Working Group overall?
2. Did the meeting meet participant expectations?
3. Do participants feel the Working Group made adequate progress toward its stated goals?

<sup>1</sup> From Kirkpatrick, D.L. (1994). *Evaluating Training Programs: The Four Levels*. San Francisco, CA: Berrett-Koehler.

4. Do participants feel they gained knowledge about the main issues related to the research problem?
5. Do participants feel they gained a better understanding of the research across disciplines related to the Working Group's research problem?
6. What impact do participants feel the Working Group will have on their future research?
7. Were participants satisfied with the accommodations offered by NIMBioS?
8. What changes in accommodations, group format, and/or content would participants like to see at future meetings?

## Evaluation Procedures

NIMBioS' Evaluation Coordinator designed an electronic survey aligned to the evaluation questions with input from NIMBioS' Director and Deputy Director. The final instrument was hosted online via UT's secure online survey host mrlInterview. Links to the survey were sent to the 14 Working Group participants on June 10, 2009. Reminder emails were sent to non-responding participants on June 15 and 18, 2009. By June 28, 2009, 11 participants had given their feedback, for a response rate of 79%.

## Data Analysis

Data from the electronic survey included both forced-response and supply-item questions. All data were downloaded from the online survey host into the statistical software package SPSS for analysis. Quantitative data were analyzed using SPSS, while qualitative data were analyzed in SPSS Text Analysis for Surveys. Qualitative responses were categorized by question and analyzed for trends.

## Findings

### Participant Satisfaction

#### Overall Satisfaction

Overall satisfaction with the Working Group was high among respondents, 100% of whom indicated they either agreed or strongly agreed that the Working Group was very productive and met their expectations. Some general participant comments:

*"I was really satisfied with the outcomes, and look forward for the second meeting."*

*"NIMBioS came across as very accommodating and helpful."*

*"Outstanding in every way. Keep it up."*

All respondents thought the presentations were useful, and all thought that the presenters were very knowledgeable about their presentation topics. Additionally, 100% of respondents either agreed or strongly agreed that they would recommend participating in NIMBioS Working Groups to their colleagues (Table 4).

Table 4. Participant satisfaction with various aspects of the Working Group, by level of agreement

	<i>n</i>	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I feel the Working Group was very productive.	11	73%*	27%	0%	0%	0%
The Working Group met my expectations.	11	91%	9%	0%	0%	0%
The presenters were very knowledgeable about their topics.	11	91%	9%	0%	0%	0%
The presentations were useful.	11	82%	18%	0%	0%	0%
The group discussions were useful.	11	91%	9%	0%	0%	0%
I would recommend participating in NIMBioS Working Groups to my colleagues.	11	73%*	27%	0%	0%	0%

\* Note: Percentages in tables may not add to 100% due to rounding

### ***Satisfaction with Accommodations***

Overall, respondents reported being satisfied with the travel, housing, and facilities provided by NIMBioS during the Working Group. One participant’s comments about the overall accommodations:

*“I don’t think NIMBioS needs to do much more. Everything needed to accomplish our objectives was provided - including excellent BBQ! Keep up the great work environment.”*

NIMBioS arranged housing and travel for eight of the respondents, all of whom said they were satisfied with their accommodations. The majority of participants also reported being satisfied with the comfort and resources of the NIMBioS facility, as well as the quality of meals provided (Table 5). One participant’s comments:

*“This was the most organized workshop I’ve ever attended. The NIMBioS personnel did an outstanding job with the logistics!”*

*“Perfect.”*

Table 5. Participant levels of satisfaction with Working Group accommodations

Please indicate your level of satisfaction with the Working Group accommodations:	<i>n</i>	Very satisfied	Satisfied	Neutral	Dissatisfied	Strongly dissatisfied
Comfort of the facility in which the Working Group took place	11	91%	9%	0%	0%	0%
Resources of the facility in which the Working Group took place	11	82%	18%	0%	0%	0%
Quality of meals	11	73%	27%	0%	0%	0%
Quality of drinks and snacks provided	11	64%	18%	18%	0%	0%

## Working Group Format and Content

### *Most Useful Aspects*

Most respondents said the multidisciplinary composition of the Working Group was its most useful aspect, as they were able to learn from those in fields other than their own:

*“Getting an understanding of (1) the research strengths of collaborators, (2) identifying the opportunities for improving models from a single discipline through discussion with researchers from multiple disciplines.”*

*“Finding people in other disciplines who I can work with, and coming to a common understanding of many relevant issues.”*

*“Getting to know each other and discussing the different ways in which epidemiology, mathematics, statistics and economics can be merged.”*

Another common theme from respondents was the idea of setting a research agenda among Working Group participants:

*“Getting in groups to conduct research and setting the next agenda.”*

*“The availability of the members of the group to sit down and explain in, detail their open questions, and their expectations from other researchers to advance their research agenda: what is [lacking] and what is needed to advance.”*

*“For the first meeting, I think the sharing of modeling perspectives was the most useful. This allowed us to connect research agendas and interests. It also allowed us to flush out the ideas and approaches that are critical for exploring predictive models for EIDs.”*

### Participant Learning

Respondents were asked several questions to gauge their levels of learning about the main issues related to the research problem, including learning about research in disciplines other than their own and mathematical models for forecasting the risks associated with emerging infectious diseases. Respondents overall reported high levels of learning, agreeing that they had a better understanding of the main research issues (Table 6).

Table 6. Participant self-reports of learning about issues related to the Working Group’s research problem

As a result of participating in this Working Group, I have a better understanding of:	<i>n</i>	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
the role of the human decision making process in disease risk modeling.	11	45%	45%	9%	0%	0%
mathematical models for forecasting the risks associated with emerging infectious diseases (EIDs).	11	18%	73%	9%	0%	0%
the techniques and results for modeling risks associated with EIDs in disciplines other than your own.	11	36%	55%	9%	0%	0%

### Progress Toward Goals

All respondents agreed that the Working Group format allowed the group to make adequate progress toward its goals of building the capacity to unify predictive models across disciplines, and developing an interdisciplinary research agenda for modeling risks associated with EIDs. Participant comments:

*“As this was the first meeting of this workgroup, I was surprised and the connections made between disciplines and look forward to seeing how much develops before the next meeting - that will be the ultimate measure.”*

*“I left the meeting with a high expectation in terms of future collaborations to, advance the area of infectious diseases. We were able to find a common ground in, several areas that will link our effort to advance science.”*

*“We were able to define a research agenda that involves individuals from different areas, and, I look forward on reporting good results in the near future.”*

All respondents also said they left this meeting with a good idea of what their contribution will be at the next meeting. One participant’s comments:

*“We have a number of goals identified. Whether or not they are all achieved is a different matter. What peoples' contribution will actually be will depend on that.”*

### **Impact on Future Research Plans**

All respondents said they felt that the exchange of ideas that took place during the Working Group would initiate and/or influence their future research. Some participant comments:

*“... At least two collaborative projects have already been hatched, connecting me with others both inside and outside of my discipline. It is clear that powerful contributions can be made by combining the approaches of two empirical philosophies. We were moving forward with the acquisition of data while still at the conference.”*

*“...It has been extremely useful to meet and discuss both with those involved in epidemiology and with computer science. My future research agenda will certainly benefit from collaboration with both groups of people.”*

*“...it will structure a new avenue in my applied statistical portfolio; I suspect that it will foster collaborations in the coming years; and allow me to make an inroad in a problem in disease transmission that I have thought about for some time, but not had the capacity, nor inspiration, nor resourcefulness, to tackle independently.”*

In addition to new ideas for research, all respondents said that they developed unanticipated plans for collaborative research with other Working Group participants:

*“...There will be an overarching evaluation of uncertainty as it relates to all the predictive approaches being investigated. Before the meeting I was contributing mainly to one investigation. However, after the first meeting, I am now participating in this additional research focus on uncertainty.”*

*“The working group exceeded my expectations in terms of all the collaborations and the smooth, transitions into groups. Everyone was quite helpful and enthusiastic to work.”*

*“...I believe I will collaborate with some of the computer scientist in order to obtain numerical solution for a simple epidemiological-economic model.”*

### **Suggestions for Future Working Group Meetings**

Respondents were asked several questions soliciting suggestions for future Working Group meetings. Overall, participants were highly satisfied with the content and format of the current meeting. The only common suggestion for change dealt with the coffee:

*“...do consider a coffee machine, rather than thermos flasks.”*

*“Would enjoy high quality coffee. This is of course a luxury. What is provided is completely fine. The food was quite good in general. The only significant element that could have improved my mood was finer coffee. Blame Starbucks.”*

## Conclusions and Recommendations

Overall, the Working Group was very successful in making progress toward its goals. Working Group respondents were satisfied with the meeting, indicating that it was a productive experience that met their expectations. Respondents were also satisfied with the travel, housing, and other amenities offered by NIMBioS.

Respondents overall reported high levels of learning, agreeing that they had a better understanding of the main research issues. All respondents agreed that the Working Group format allowed the group to make adequate progress toward its goals of building the capacity to unify predictive models across disciplines, and developing an interdisciplinary research agenda for modeling risks associated with EIDs. All respondents also said they left this meeting with a good idea of what their contribution will be at the next meeting.

All respondents indicated they planned to take the knowledge they gained during the Working Group and apply it to their own research, and that they had developed solid plans for collaborative research with other Working Group participants. The only suggestion for improvement offered by the participants was better coffee.

Based on analysis of participant response data, the recommendations are as follows:

- Participants were extremely satisfied with the working group content and format; no changes are needed in this area.
- The Working Group had a multidisciplinary composition, but consider trying to recruit a broader diversity of participants regarding gender and ethnicity.
- Consider providing participants with different coffee

## **Appendix A**

### ***List of Participants***



## Participants

Last name	First name	Institution
Ceddia	Graziano	University of Reading
Chowell-Puente	Gerardo	Arizona State University
*Daszak	Peter	Consortium for Conservation Medicine
*Fenichel	Eli	Arizona State University
Finnoff	David	University of Wyoming
Garrett	Lynn	United States Department of Agriculture APHIS
Hickling	Graham	NIMBioS
Holloway	Garth	University of Reading
*Horan	Richard	Michigan State University
Jerde	Chris	Notre Dame
*Perrings	Charles	Arizona State University
Springborn	Michael	University of California Davis
Velazquez	Leticia	University of Texas El Paso
Villalobos	Christina	University Texas Pan American

**\* Organizer of Working Group**

## **Appendix B**

### ***SPIDER Working Group Survey***

## SPIDER Working Group Survey

Thank you for taking a moment to complete this survey. Your responses will be used to improve the Working Groups hosted by the National Institute for Mathematical and Biological Synthesis. Information supplied on the survey will be confidential, and results will be reported only in the aggregate.

NIMBioS will send two reminder emails to Working Group participants who have not responded to this survey. If you would like to be excluded from these reminder emails, please enter your name below. Your survey results will still remain confidential and your name will not be associated with any of your responses in reporting of survey results.

Name:

Please check the appropriate box to indicate your level of agreement with the following statements about this Working Group: (Very satisfied, Satisfied, Neutral, Dissatisfied, Very dissatisfied)

I feel the Working Group was very productive.

The Working Group met my expectations.

The presenters were very knowledgeable about their topics.

The presentations were useful.

The group discussions were useful

I would recommend participating in NIMBioS Working Groups to my colleagues.

Please check the appropriate box to indicate your level of agreement with the following statements.

As a result of participating in this Working Group, I have a better understanding of:

(Strongly agree, Agree, Neutral, Disagree, Strongly disagree)

the role of the human decision making process in disease risk modeling

mathematical models for forecasting the risks associated with emerging infectious diseases (EIDs)

the techniques and results for modeling risks associated with EIDs in disciplines other than your own

Do you feel the working group made adequate progress toward building the capacity to unify predictive models across disciplines?

Yes

No

Comments:

Do you feel the working group made adequate progress toward developing an interdisciplinary research agenda for modeling risks associated with EIDs?

Yes

No

Comments:

Do you feel the expectations for the next Working Group are clear (in the sense that you are leaving this meeting with a good idea of what your contribution will be at the next meeting)?

Yes

No

Comments:

Do you feel that the exchange of ideas that took place during the Working Group will initiate or influence your future research? Please explain:

Did you develop unanticipated plans for collaborative research with other Working Group participants? Please explain:

What do you feel was the most useful aspect of the Working Group?

What would you have changed about the Working Group?

How do you feel about the format of the Working Group?

This was a very effective format for achieving our goals

This was not a very effective format for achieving our goals ->

The Working Group format would have been more effective if:

Is your work currently supported by an NSF grant?

Yes

No

Name of NSF grant:

Institution at which NSF grant is held:

Was your housing during the Working Group arranged by NIMBioS?

Yes ->

No

Overall, how satisfied were you with your housing arrangements?

Very satisfied

Satisfied

Neutral

Dissatisfied

Very dissatisfied

Comments about housing arrangements:

What could NIMBioS have done to make your stay in Knoxville more enjoyable (e.g. better information about nearby attractions, public transportation, etc.)?

Was your transportation to Knoxville arranged by NIMBioS?

Yes ->

No

Overall, how satisfied were you with your travel arrangements?

Very satisfied

Satisfied

Neutral

Dissatisfied

Very dissatisfied

Comments about travel arrangements:

Please indicate your level of satisfaction with the Working Group accommodations:

(Very satisfied, Satisfied, Neutral, Dissatisfied, Very dissatisfied)

Comfort of the facility in which the Working Group took place

Resources of the facility in which the Working Group took place

Quality of meals

Quality of drinks and snacks provided

Please indicate any changes NIMBioS can make to improve the resources and/or accommodations available to Working Group participants:

Additional comments about Working Group accommodations:

Please provide any additional comments about your overall experience with the Working Group:

## Demographics

Your participation in answering the following questions is completely voluntary and will be used for aggregated reporting only. Answer only those questions with which you feel comfortable.

I am a(n):

Graduate student

Postdoctoral researcher

University faculty—teaching/research

University faculty—teaching only

University faculty—research only

University staff

Government

Business/industry employee

Non-profit organization employee

Other:

If you are affiliated with a college/university, please describe your institution: (check all that apply)

2-year institution

4-year institution

Minority serving institution

Women's only institution

Not applicable

What is your general area of expertise/research/study?

(Select from a list)

What is your area of concentration within this general area?

(Select from a list)

Gender:

Male

Female

Are you Hispanic or Latino?

Yes

No

What is your racial background? (check all that apply)

American Indian or Alaska Native

Native Hawaiian or other Pacific Islander

Asian

Black or African American

White

## **Appendix C**

### ***Open-ended Survey Responses***

## Open-ended responses, by question and response category

### **Do you feel the working group made adequate progress toward building the capacity to unify predictive models across disciplines? (n=5)**

As this was the first meeting of this workgroup, I was surprised and the connections made between disciplines and look forward to seeing how much develops before the next meeting - that will be the ultimate measure.

I think it's a good start. But it won't happen after just one or two meetings.

We made a start, that is all. There is a long way to go on this, but we have a useful framework and several potentially productive lines of inquiry.

I left the meeting with a high expectation in terms of future collaborations to, advance the area of infectious diseases. We were able to find a common ground in, several areas that will link our effort to advance science.

It was great; well organized; hospitality appreciated; and a chance for the applied Bayesian to get acquainted with some interesting models in disease transmission.

### **Do you feel the working group made adequate progress toward developing an interdisciplinary research agenda for modeling risks associated with EIDs? (n=6)**

Every research focus has members from Mathematics/Statistics, Economics, and Biology. Outstanding development.

Again, it's a good start.

'Adequate' - bearing in mind that this is first meeting, and that not everyone was able to make it.

particularly pleased that we are now thinking seriously about H1N1

several research areas were discussed and participants asked to be placed in certain, research groups depending on their interests

We were able to define a research agenda that involves individuals from different areas, and, I look forward on reporting good results in the near future.

### **Do you feel that the exchange of ideas that took place during the working group will influence your future research? Please explain: (n=11)**

Absolutely. At least two collaborative projects have already been hatched, connecting me with others both inside and outside of my discipline. It is clear that powerful contributions can be made by combining the approaches of two empirical philosophies. We were moving forward with the acquisition of data while still at the conference.

Yes. Given the number of projects I have listed on my "to do" list after the meeting, there is no doubt my research direction has shifted.

Yes. We've already put together interdisciplinary groups to begin new research projects.



Yes, various numerical and statistical techniques discussed have the potential to be useful.

Yes. I have developed new collaborations and some new projects, as a result of discussions at the meeting.

Yes, the incorporation of economic aspects into epidemiological models

It will make me always check that modeling exercises have correctly considered human reactions to outbreaks

Yes, I was very excited about this topic before attending the workshop as it is a new area for me. I had wanted such an opportunity to collaborate in and it was perfect.

Yes, I look forward on understanding the mathematical models and provide my , expertise in optimization techniques to accelerate and obtain more accurate, numerical results.

It definitively will. It has been extremely useful to meet and discuss both with those involved in epidemiology and with computer science. My future research agenda will certainly benefit from collaboration with both groups of people.

Yes; definitely; it will structure a new avenue in my applied statistical portfolio; I suspect that it will foster collaborations in the coming years; and allow me to make an inroad in a problem in disease transmission that I have thought about for some time, but not had the capacity, nor inspiration, nor resourcefulness, to tackle independently.

**Did you develop unanticipated plans for collaborative research with other working group participants? Please explain: (n=10)**

Yes. See previous comment. One of the two projects would likely never have been hatched without cross-conversations with a few different people over the course of a day.

Yes. There will be an overarching evaluation of uncertainty as it relates to all the predictive approaches being investigated. Before the meeting I was contributing mainly to one investigation. However, after the first meeting, I am now participating in this additional research focus on uncertainty.

Yes, as I indicated in my last response.

Yes - these are reflected in the set of working topics identified by the group.

Yes. I had hoped to develop some new collaborations in the area of math programming and disease demographic estimation. Both seem to be developing.

Yes - I'm going to be involved in some of the H1N1 work

The working group exceeded my expectations in terms of all the collaborations and the smooth, transitions into groups. Everyone was quite helpful and enthusiastic to work.

Yes, we were able to form collaborative groups that will concentrate in specific research targets.

Yes. I believe I will collaborate with some of the computer scientist in order to obtain numerical solution for a simple epidemiological-economic model.

yes

**Do you feel the expectations for the next working group are clear (in the sense that you are leaving this meeting with a good idea of what your contribution will be at the next meeting)? (n=4)**

Somewhat clear -- I had to leave a day early, so I was not privy to the discussion of the next meeting.

We have a number of goals identified. Whether or not they are all achieved is a different matter. What peoples' contribution will actually be will depend on that.

There are sub groups with tasks to complete.

I look forward on reporting positive numerical results as compared to the ones currently obtained, for a specific problem explained during this meeting.

**What do you feel was the *most* useful aspect of the working group? (n=11)**

Getting an understanding of (1) the research strengths of collaborators, (2) identifying the opportunities for improving models from a single discipline through discussion with researchers from multiple disciplines.

For the first meeting, I think the sharing of modeling perspectives was the most useful. This allowed us to connect research agendas and interests. It also allowed us to flush out the ideas and approaches that are critical for exploring predictive models for EIDs.

Finding people in other disciplines who I can work with, and coming to a common understanding of many relevant issues.

The identification of a general framework - network, node, edge - with which to analyze EIDs.

For this meeting it was meeting and discussing. I think people are on similar pages now. As the meeting progressed, it was useful to have unstructured time for collaboration.

To get to know other participants strengths for this project

Social interaction with the group - brainstorming ideas together in a room is much more powerful than email chit-chat.

Getting in groups to conduct research and setting the next agenda.

The availability of the members of the group to sit down and explain in, detail their open questions, and their expectations from other researchers to, advance their research agenda: what is being lack and what is needed to advance.

Getting to know each other and discussing the different ways in which epidemiology, mathematics, statistics and economics can be merged.

Sharing experience with junior colleagues and learning about the different ways and the similar ways we do research in diverse fields.

**What would you change about the working group? (n=10)**

Nothing comes to mind.

More break out groups to focus on projects. I anticipate this will happen in future meetings and realize this first meeting needed to have more involvement of the entire group.

Nothing comes to mind.

We have already conducted our own postmortem, and thought about things that ought to change simply because we will be in a different state at the second meeting. But since this was a very good start, the short answer is that we would change little.

I don't know.

nothing

Nothing.

to have collected information of the people involved in the group, and main papers that describe common vocabulary that will be used, in the area of infectious diseases.

perhaps I would make the agenda a bit less tight.

More free time to explore collaboration more informally.

**The working group format would have been more effective if: (n=0)**

**Name of NSF grant: (n=3)**

BESTNet

1) NIH/NSF 'Ecology of Infectious Diseases' program #NSF EF-0622391 "Predicting spatial variation in West Nile virus transmission" (Kilpatrick PI), 2) NSF Human and Social Dynamics 'Agents of Change' award (SES-HSD-AOC "Human-related factors affecting emerging infectious diseases": BCS – 0826779) Daszak PI, 3) NIH/NSF "Ecology of Infectious Diseases" award from the NIH John E. Fogarty International Center 2R01-TW005869 ("The Ecology, Emergence and Pandemic Potential of Nipah virus in Bangladesh". Daszak PI

1. NEESR-SG : High-Fidelity Site Characterization by Experimentation, Field , Observation, and Inversion-Base Modeling, 2. Cyber-ShARE: Center for Sharing Cyber-Resources to Advance Research and, Education

**Institution at which NSF grant is held: (n=3)**

ASU

Wildlife Trust

1. Carnegie Mellon, 2. UT-EI Paso

**Comments about housing arrangements: (n=7)**

None.

This was the most organized workshop I've ever attended. The NIMBioS personnel did an outstanding job with the logistics!

No problems.

Nice hotel - 4 seasons

all was fine.

Very amicable and easy to get a hold of them.

Perfect

**What could NIMBioS have done to make your stay in Knoxville more enjoyable (e.g. better information about nearby attractions, public transportation, etc.)? (n=10)**

Support was great.

I don't think NIMBioS needs to do much more. Everything needed to accomplish our objectives was provided - including excellent BBQ! Keep up the great work environment.

I can't think of anything.

I was pleasantly surprised. NIMBioS offers generally very nice facilities. But do consider a coffee machine, rather than thermos flasks.

It was great.

it was perfect

Nothing much - the trip was very smooth. The social side was good (Calhoun's). We were made to feel very welcome.

All was good. We did not have much time to sightsee but at the same time it provided the opportunity to better know my colleagues.

everything was perfect, thanks

Nothing really.

**Comments about travel arrangements: (n=6)**

Went very smoothly. Very minor comment: minimizing layover times (when possible) is good.

Fine. I had to change my onward flights and the agent handled this easily.

Airlines are airlines. On NIMBioS end everything was fine.

The airline travel was booked by NIMBioS and I received very thorough information about ground transportation.

excellent in providing the best quote.

Fine

**Please indicate any changes NIMBioS can make to improve the resources and/or accommodations available to working group participants: (n=7)**

Would enjoy high quality coffee. This is of course a luxury. What is provided is completely fine. The food was quite good in general. The only significant element that could have improved my mood was finer coffee. Blame Starbucks.

I can't think of anything.

Minor: Breakfast options that provide protein rather than carbohydrates, and better delivery options for coffee and water would be good.

I think you've got it just right. Looking forward to the next visit.

Probably a bit more food for the participants--not in terms of variety but just the quantity, , especially for breakfast and lunch.

I'd prefer a different brand of coffee if possible.

None really

**Additional comments about working group accommodations: (n=1)**

the accommodations were perfect, thanks

**Please provide any additional comments about your overall experience with the working group: (n=4)**

NIMBioS came across as very accommodating and helpful.

Outstanding in every way. Keep it up.

I think the organizers and staff did an outstanding job!

I was really satisfied with the outcomes, and i look forward for the second meeting.