



2015  
BRIGHT IDEAS CONFERENCE  
WEDNESDAY, APRIL 29  
SUBMISSION FORM

Primary Presenter: Mr. Asmerom Tesfamichael  
Title (Dr., Ms., Mr.) First Name Last Name

Rank: Graduate Assistant Dept: Mathematics and Statistics

Faculty Co-Presenters:  
Dr. Kent Riggs

Graduate Student Co-Presenters:  
Asmerom Tesfamichael

Title of Exhibit:  
A fixed-inverse binary misclassification model under possible false-positive misclassification

**In the box below, please provide a 200-word, single-spaced abstract of your proposed Exhibit Presentation, including its importance to your field. All abstracts will appear in the conference proceedings.**

In this project, we develop a particular statistical model for binary data that allows for the possibility of false-positive misclassification. To account for the misclassification, the model incorporates a two-stage sampling scheme. The first stage in the two-stage sampling scheme involves the use of a fallible classifier that is prone to producing false-positives under fixed sampling. The second stage involves using an infallible and fallible classifier under inverse sampling. The binomial distribution is used in stage one, while the negative multinomial distribution is implemented in stage two.

Next, we apply maximum likelihood methods to find estimators of the primary prevalence parameter  $p$  as well as the false-positive misclassification rate parameter  $\phi$ . In addition, we derive confidence intervals for  $p$  based on inverting Wald, score and likelihood ratio statistics.

Also, we graphically compare coverage and width properties of the Wald-based, score-based, and likelihood ratio-based confidence intervals for  $p$  through a Monte Carlo simulation. The simulation study is done under different parameter and sample size configurations. Lastly, we apply the newly-derived confidence intervals for  $p$  to a real data set.

**Type of display/presentation:** (poster, tri-fold display, 3-D exhibit, etc. - describe below)  
poster

**Display/exhibit spaces are a 4' x 8' area - Please check your anticipated requirements**

Display requirements:

- ☐ Lattice panel 4' wide x 8' tall  
or  
☒ Full cork board 6' wide x 4' tall  
or  
☐ Half cork board 3' wide x 4' tall (½ exhibit space - 4' deep x 4' wide)  
or  
☐ Easel – 2' x 6' (should hold up to 4' wide posters)

Additional options:

- ☐ Table - 3' deep x 8' long  
☐ Access to power (Limited - please request only if required.)  
☐ Other, please specify (e.g., screen, chairs, etc.)

*Computers are not provided; security for exhibitor's computers or other equipment is not provided.*

We will provide video and computer to play it.

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If selected, I will be present with my Exhibit at one or more of the following times:

- ☐ 11 am – 12    ☐ 12 – 1 pm    ☐ 1 – 2 pm    ☒ 2 – 3 pm    ☒ 3 – 4 pm

**Submission Instructions:**

- **E-mail your electronic submission form to your designated BIC college representative no later than Friday, February 27, 2015**
- **Please consult your dean or college conference representative regarding college-specific submission requirements, if any.**

*Call Andrew Ormsby at 468-7689 if you have any questions about exhibit space requirements.*