

We are seeking to recruit Ph.D. students who are passionate about machine learning and mathematical modeling of disease dynamics for admission **as starting date of January 2020 or earlier is preferred**. Successful applicants will join multi-disciplinary teams working on exciting projects funded through National Institute of Food and Agriculture – USDA.

PhD opportunity is on the improvement of machine learning methods with application to predict swine disease outbreaks & the development of generic modelling framework to simulate swine disease spread between individual farms while considering biosecurity settings. Project details:  
<https://cris.nifa.usda.gov/cgi-bin/starfinder/120245/crisassist.txt>

This exciting PhD position is **fully funded by USDA-NIFA** and is offered at the Department of Population Health and Pathobiology at North Carolina State University College of Veterinary Medicine, is now open.

This research aims: **1)** the development of new machine learning algorithms to predict the risk of porcine reproductive and respiratory syndrome virus (PRRSv) spread which will promote informed and targeted disease management and prevention. **2)** Development of a generic modelling framework to simulate swine disease spread between individual farms while considering biosecurity leakage, will identify how fast and how far PRRSv can spread within and between farms, finally identify the role of biosecurity factors in the disease spread.

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Candidates must have skills in epidemiology or quantitative discipline (ecology, epidemiology, applied mathematics, physics, statistics) (master level or equivalent) and scientific writing.

The project will include training in modelling, epidemiological analysis and machine learning analysis. The PhD will result in high impact journal articles, and results being presented at national/international meetings and conferences.

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The position is based within Dr. Gustavo Machado laboratory at NCSU with collaboration from Iowa State University Dr. Daniel Linhares and Dr. Derald J Holtkamp.

Applications shall include:

- 1) a cover letter of no more than two pages that highlights your research interests, interest in graduate school, interest in infectious diseases, and why we should consider your application
- 2) curriculum vitae
- 3) unofficial transcripts
- 4) sample of scientific writing (e.g., a manuscript in preparation, an undergraduate thesis, published manuscript as the first author)
- 5) contact information for 3 references who can explain your research skills and interests. References will only be contacted after applicants are notified.

If you have questions specific to the positions please contact Gustavo Machado at [gmachad@ncsu.edu](mailto:gmachad@ncsu.edu)

Literature related to this project can be found here:

- Machado, G., et al. 2015: What variables are important in predicting bovine viral diarrhea virus? A random forest approach. *Vet. Res.* DOI: 10.1186/s13567-015-0219-7.
- Machado, G., et al. 2019: Identifying outbreaks of Porcine Epidemic Diarrhea virus through animal movements and spatial neighborhoods. *Sci. Rep.* DOI: DOI:10.1038/s41598-018-36934-8.
- Silva, G. Machado, G. et al 2019. Machine-learning algorithms to identify key biosecurity practices and factors associated with breeding herds reporting PRRS outbreak