**SECOND YEAR STUDENT ANNUAL STUDENT ACTIVITIES REPORT**

Name: Vincent Baker Entry Year in the Program: 2014 (Part time PhD candidate)

# **STUDENT’S REPORT**

**Academics:**

List all courses already taken (for PHYS 997, add the total number of credits including the current quarter):

**All coursework is complete, MS degree awarded.**

List all courses **to be taken**, including course number, title, and quarter.

For example: PHYS 531 Galactic Astrophysics, Fall 2018.

**None (only PHYS 998).**

**Research:**

1. Qualifying exam project advisor: **Luis Cruz Cruz**

Title: **Computational Properties of Neural Columns arising from Temporal Dynamics**

Date of the exam: **6/5/2018**

Results of exam (pass – not passed): **Pass**

If not passed, date of second exam:

1. Has your qualifying exam research adviser agreed to supervise your Ph.D. thesis? If no, then specify new advisor. **Yes**.
2. Summarize results to date of your research. You may give bullet points with supporting detail. Lack of detail will be interpreted as lack of progress.

* Developed a neural network simulation in MATLAB incorporating the Izhikevich dynamical model and distance-dependent propagation delays.
* Modeled a simplified neural column structure with biologically inspired structure and connectivity.
* Demonstrated that distance-dependent delays can give rise to synchronous firing and wave-packet propagation in these structures.
* Showed that the modeled neural column possesses at least some of the required properties to be used in the reservoir computing paradigm.

1. Describe research goals for the coming academic year. You may give bullet points with supporting detail. Lack of detail will be interpreted as lack of planning.

* Extend the current single-column structure into an ensemble of weakly connected columns.
* Incorporate the neural column simulation as the “reservoir” in a speech recognition system based on the reservoir computing paradigm. Train and test the reservoir against open-source speech data.

1. **Publications.** List articles/chapters published or in press. Be sure to note status (i.e., submitted, working on revisions, accepted, published) and type (peer-reviewed article, non-reviewed article, paper in conference proceedings, etc.).
2. **Conference Activities.** List all conference activities. Please specify, for each, whether it is a paper presentation, presentation w/o paper, workshop, poster session, etc. and whether it was presented already, accepted for presentation, or submitted for presentation. Include date, title of paper/presentation, name of conference, and location of conference.
3. List **other research and other scholarly activities** that do not fit into the categories listed above (e.g., manuscripts in progress, colloquia on your research, graduate student research grants/fellowships applied for, etc.)

**Teaching**

N/A

**Outreach**

List all outreach activities in which you have participated.

**Electronic Signature: Vincent J Baker**

**Date: 9/6/2018**

**ADVISOR’S COMMENTS**

Please provide specific comments on the progress the student has made in research during the past year. If the student is not making adequate progress please explain why.

**Printed Name:**

**Electronic Signature:**

**Date:**