**Data Management Plan**

**I. Types of data**

Theoretical Component

1. Software: We have written and will write computer code to simulate neural network development in the context of varying geometric configurations. We will also write code to simulate in an abstract context functions that such networks may be able to perform.
2. Database: We will store simulation data in database files for downstream analysis.
3. Theoretical work: We will do manual pen-and-paper work to document the process of theory construction.

Experimental Component

1. Lab notebooks: We will record the details of experimental design, protocols, and experimental results in standard laboratory notebooks for the purpose of documentation.
2. Database: We will initially record data in spreadsheets and use them to instantiate databases to support downstream comparison to models developed in the theoretical component of the project and other forms of statistical analysis for the purpose of representing important features of the data.
3. Images: A wide variety of images, in different shape and structure, are expected to be created and shared for use. The home-grown programs typically use Matlab, and output an image along with its graphic, representing a quantitative evaluation of activity. A significant proportion of images will be created in the Leica SP5 confocal microscope.

**II. Standards for data and metadata**

Theoretical Component

1. Software: We will apply version control using git to our source code and will document it with both abstract explanation and concrete example. We will make use of README files to explain the use of various functions.
2. Database: We will adhere to SQL standards for relational database management systems (RDBMSs).
3. Theoretical work: Pen-and-paper work will be captured via use of tablet computers or scanned and stored in PDF format. This data will be stored on a local lab server and backed up both locally and remotely on daily, weekly, and monthly bases.

Experimental Component

1. Lab notebooks: These notebooks will contain descriptions of experimental details including protocols, preparation techniques, and unique identifiers for individual experiments and associated results. These procedures will support deposition into a relational database for downstream analysis.
2. Database: We will extract data from laboratory notebooks and incorporate them into a relational database that both experimental and theoretical groups will have access to via a central server hosted by the Bergman lab. This procedure will foster direct analysis and communication about results between the theoretical and experimental groups.
3. Images: Image files will be saved from Matlab in a variety of formats including tiff, jpeg, bmp and png, depending on the source and type of image. Ongoing activity, along with the graphic analysis of fluorescence intensity, is captured on a movie in the mp4 video format. The Leica SP5 utilizes the proprietary Leica LIF file format.

**III. Policy for access, sharing, and provision for appropriate privacy and protection**

Theoretical Part

1. Software: We will develop our code in the open by making or git-versioned code available in real-time on github. We hope to support thorough internal (between and among both theorists and experimentalists) and external review of our methods. This will also serve to support so-called Open-Notebook science in general.
2. Database: The database containing simulation results will be hosted locally due to its size and will not be made directly available to the general public; however, all of the necessary code to generate the data will be publicly available as mentioned above. The database containing simulation results will be available in realtime to all members of both the theoretical and experimental groups.
3. Theoretical work: PDF copies of notes will be hosted on a server by the Bergman lab to ease sharing ideas between the theoretical and experimental groups and to enhance the quality of internal and external review.

Experimental Part

1. Lab notebooks: Details of lab notebooks will not be made available directly but will be made available indirectly through the database into which such details and associated results will be deposited.
2. Database: The database containing details of experiments will be made available to all members of both the theoretical and experimental groups via a centralized web server. If the data should become relevant to be made available to the public via publication or otherwise, we will do so via a server hosted by the Bergman lab.
3. Images: All original image data is preserved on the computer running the experiment with a backup on the main laboratory server. Another copy for analysis and processing will be shared on a shared server and database available to both labs.

**IV. Policy and provision for redistribution and reuse**

1. Software, Databases, and Images will be shared in an unrestriced manner and in real-time with the research community.
2. The details of the theoretical work will be written up in clear and accessible form in papers and the scratchwork that may be used to foster collaboration between the theoretical and experimental groups will only be made available upon request.

**V. Plans for Archiving and Preservation of Access**

1. Software will be stored on github which will maintain long-term up-to-date access. Databases will be made available in relevant public repositories or via a central server that is part of the Bergman lab. Images will similarly be made available via the Bergman lab server.
2. Theoretical work will be archived via the PDF/A standard and kept in local servers in the Bergman lab. Lab notebooks will be archived in paper format in the Moses lab and will also be archived in the database that will be used for sharing data between the two groups and with the research community and general public.