**2018 IMAG Futures Meeting – Moving Forward with the MSM Consortium (March 21-22, 2018)**

*Pre-Meeting Abstract Submission Form*

*\*Please submit to the NIBIB IMAG mailbox (*NIBIBimag@mail.nih.gov*) by* ***January 8th, 2018***

*\*Save your abstract as “MSM PI Last Name \_ 2018 IMAG Futures Pre-Meeting Abstract”*

**PI(s) of MSM U01: Rajanikanth Vadigepalli, Jan Hoek**

**Institution(s): Thomas Jefferson University**

**MSM U01 Grant Number: EB023224**

**Title of Grant:** Modeling Multiscale Control of Liver Regeneration

**Abstract**

Which MSM challenges are you addressing from the IMAG 2009 Report and how?

<https://www.imagwiki.nibib.nih.gov/content/2009-imag-futures-report-challenges>

(indicate which challenge (#) you’re addressing)

*You may insert images by copying and pasting below*

#5 Reproducible and reusable multiscale models that will be integrated and adopted into model-poor fields

Are you using machine learning and or causal inference methods and how?

*You may insert images by copying and pasting below*

 We are employing ordinary differential equation-based approaches to develop a model of cellular and molecular network driving liver regeneration. We are utilizing nonlinear optimization methods to identify parameter values based on fit to available data as well as model parsimony considerations.

Please briefly describe significant MSM achievements made (or expected).

*You may insert images by copying and pasting below*

 Thus far, we have developed a network model that incorporates functional state transitions of multiple liver cell types. Model simulations and analysis led to predictions on previously unknown state transitions of hepatic stellate cells. Our initial single cell gene expression assays support this model prediction, but also pointed to additional cell states missing in the model. We are in the process of incorporating the single cell analysis results into the model, to iteratively develop the next version of the cellular network model of liver regeneration.

Please suggest any new MSM challenges that should be addressed by the MSM Consortium moving forward.

*You may insert images by copying and pasting below*

 Develop freely accessible and rigorous didactic/training resources on various MSM methods and illustrative applications

What expertise are on your team (e.g. engineering, math, statistics, computer science, clinical, industry) and who?

*Please list as “Expertise – Name, email”*

 *Systems Engineering – Rajanikanth Vadigepalli,* *Rajanikanth.Vadigepalli@jefferson.edu* *Molecular Biology and Biochemistry – Jan Hoek,* *Jan.Hoek@jefferson.edu* *Bioinformatics – Madhur Parihar,* *Madhur.Parihar@jefferson.edu* *Molecular Biology and Immunology – Ankita Srivatsava,* *Ankita.Srivatsava@jefferson.edu* *Biomedical Engineering – Aalap Verma,* *averma@udel.edu*

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