# Thesis Portfolio

## Designing Data Visualizations for Open Science

(Technical Report)

## Incentive structure for Open Science in Web 2.0

(STS Research Paper)

An Undergraduate Thesis

Presented to

The Faculty of the

School of Engineering and Applied Science

University of Virginia

In Partial Fulfillment

Of the Requirements for the Degree

Bachelor of Science in Computer Science

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May 2, 2014

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# Sociotechnical Synthesis

Science should be transparent: its workflows, claims, data, and analysis should be public to facilitate reanalysis, critique, and reuse. The more data is made openly available in a useful manner, the more efficient scientific process becomes, to the benefit of society. However, barriers for scientists to practice open science, specifically, to share research materials online, exist due to a range of cultural and technological reasons. This thesis seeks to understand the incentive structure for open science from a socio-cultural perspective, and attempts at a software solution to facilitate its implementation. We hope that our work will encourage further movement towards an open scientific knowledge commons.

The STS research of this thesis elucidates that current scientific reward system needs to be changed to facilitate open science. To create incentives for researchers to open up their research materials for the broader community, organizations need to provide researchers with intrinsic rewards, proper credit allocation, and tangible career benefits. Through a discussion about the past, present and future of reward system in scientific research, we provide a clearer picture about the challenges and potential strategies to reform the process of scientific communication.

The technical portion of this thesis looks at the problem from the software perspective. In this project, we create an interactive research exploration and organizing tool for the Open Science Framework, an online community to promote sharing and reuse of research. As multiple groups and organizations are involved in developing tools to

facilitate open science an online environment, we contribute to this collective effort by making the creation of incentives as an explicit design goal for open science web applications.

This research makes its contribution towards a common goal of achieving a world in which science is open by default. The promotion of open science relies on creating an effective incentive structure and the development of cultural environment and software platforms that reflect this vision play a principal role in this movement. We encourage others of the wider scientific community to join the discussion to identify the problems they face in publishing, discovering, and reusing research online, and we hope that organizations providing open science tools think in terms of creating incentives and rewards for users of their tools.

I am grateful to members of the Center for Open Science, especially Jeffery Spies and Joshua Carp for their generous help on the technical project. Acknowledgement should also be given to Professor James Cohoon and Professor Brian Nosek for their input on the design side of the technical product. Particular thanks must go to Professor Michael Gorman for his insightful comments and suggestions for the STS research of this thesis. This research could not be successful without those who involved and helped me.