Dissertation Completion Proposal Student Application Form

Steven Gomez
Submitted on March 8, 2014
Text from the online form is copied below. Instructions on the form are colored dark red in this document.

Name (first and last)

Steven Gomez

Banner Number

████████

Email Address

steveg@cs.brown.edu

Department

Computer Science

The Graduate School will do its best to place you in the most appropriate teaching appointment, given your skill set and preferences. Do you have an appointment in mind?

Teaching Assistant for CSCI 2370: Interdisciplinary Scientific Visualization in Fall 2014 or Spring 2015.

External Funding:
Have you received external funding as a graduate student at Brown?

Yes

What is the total dollar amount of external funding you have received?

Please list the awards and academic year for which it was received. Please indicate whether you have received a top-up from the Graduate School for external funding.

I was a Research Assistant (RA) on external grant funding from the summer of 2010 up through and including the summer of 2013. During this time, my stipend, 1/4 tuition, and health services fee were provided from the RAship. The Graduate School supplemented this support with health insurance and the remaining 3/4 tuition.

Background:
Explain why additional time is needed to complete your dissertation. (250 words or less)

The additional time granted by this funding is needed to finish ongoing experiments and submissions of my research results to peer-reviewed venues, and to complete the dissertation document. The nature of my research had made it difficult for me to finish in five or fewer years. Studying data visualization, it has been necessary for me to develop some expertise over the past few years in various application areas, like visual analytics and brain connectivity visualization. These areas have provided me with concrete problems, software, and datasets for developing and evaluating hypotheses about visualization. Without exploring these areas, my dissertation would be less impactful.

Furthermore, I have pursued a professional goal of teaching a course in the Computer Science department, CSCI 0931: "Introduction to Computation for the Humanities and Social Sciences". I was given this unique opportunity after presenting my PhD proposal, and spent time preparing for the course over the last year. I am teaching the course this semester, which involves preparing and giving lectures, office hours, grading, and curriculum development. While the course requires significant time spent outside my dissertation research, it is extremely rewarding and has helped me confirm my goal to conduct research and teach in academia after finishing my PhD.

Academic achievements:
Provide evidence for your academic achievements during your doctoral studies at Brown. This should include, if applicable, a list of publications that resulted from your work, of presentations at conferences or other scholarly work, and of any internal competitive fellowships that you may have been awarded. Describe how far you have advanced toward your dissertation. Explain where you stand in regard to necessary field work and research. Describe what part of the dissertation is written. (500 words or less)

Papers:

Different Strokes for Different Folks: Visual Presentation Design Between

Disciplines
IEEE Trans. on Visualization and Computer Graphics, Dec. 2012
Presented at IEEE InfoVis, 2012
Steven R. Gomez, Radu Jianu, Caroline Ziemkiewicz, Hua Guo, and David H. Laidlaw

Modeling Task Performance for a Crowd of Users from Interaction Histories
ACM CHI, 2012, Honorable Mention Award
Steven R. Gomez and David H. Laidlaw

Analysis Within and Between Graphs: Observed User Strategies in Immunobiology Visualization
ACM CHI, 2012
Caroline Ziemkiewicz, Steven Gomez, and David H. Laidlaw

A Fiducial-Based Tangible User Interface for White Matter Tractography
ISVC'10, 2010
Steven R. Gomez, Radu Jianu, and David H. Laidlaw

Extended Abstracts and Posters:

Visualization to Facilitate Structured Exploration of Published Findings in Rat Brain Connectivity
IEEE InfoVis (Poster session), 2013
Hua Guo, Steven R. Gomez, Mark J. Schnitzer, David H. Laidlaw

Toward a Visual Interface for Brain Connectivity Analysis
ACM CHI Extended Abstracts (Poster session), 2013
Hua Guo, Arthur Yidi, Steven R. Gomez, Mark J. Schnitzer, David Badre, and David H. Laidlaw

Modeling Human Performance from Visualization Interaction Histories
IEEE InfoVis (Poster session), 2011, Honorable Mention Award
Steven R. Gomez and David H. Laidlaw

Interacting with Live Preview Frames: In-Picture Cues for a Digital Camera Interface
ACM UIST (Poster Session), 2010
Steven R. Gomez

Awards:

Honorable Mention in Notes category, ACM CHI – 2012
Honorable Mention in Poster category, IEEE InfoVis – 2011

Thesis:

Title: "Incorporating Crowd-Powered Evaluations Into Visualization Development"
Advisor: David H. Laidlaw (Brown Computer Science)
Committee: James Hays (Brown Computer Science), Steven Sloman (Brown CLPS)

Proposed outline for the dissertation:
Chapter 1: Introduction
Chapter 2: Background
Chapter 3: Modeling Task Performance with Non-Experts
Chapter 4: Modeling Gaze Behaviors with Non-Experts
Chapter 5: Measuring Insights and Task Performance for Visual Analytics
Chapter 6: Crowdsourced Evaluation Framework
Chapter 7: Conclusions

An outline for the dissertation is proposed above. Peer-reviewed research for Chapter 3 has been published, and research manuscripts that will be the basis of Chapters 4 and 5 are in preparation. These works will be submitted to a top-tier conference in my field later this spring. Both papers are part of my thesis topic, which is about incorporating crowdsourced participants in the visualization development process. In one project, we have implemented and evaluated a system that estimates user eye-tracking data for visualizations using a web-based interface. These data are helpful to visualization designers, but are hard to collect because it traditionally requires participants to perform the study in a lab with expensive eye-tracking hardware. My second ongoing project is the result of a collaboration aimed at building better visual analytics tools. We designed a novel evaluation methodology that collects both qualitative information about users' insights that a visualization helps generate, in addition to quantitative scores for response time and accuracy on fixed tasks. Using the same tools we developed for this study, I am planning to reproduce our evaluation results using crowdsourced participants and analyze the successes and failures of adapting the evaluation methodology to the crowd.

Financial need: Briefly describe your financial situation and why 6th year support is needed. (200 words or less)

It is unclear whether I will have funding next year without the support of the Graduate School. I was nominated for a Google PhD Fellowship by the Computer Science department this spring and have submitted a fellowship proposal to this competitive program. The notification date for this award is May 2014. Unfortunately, I do not have the personal financial resources to work full time on completing my dissertation without the support of the Graduate School or external funding.

No

Dissertation completion plan:

Describe your plan for completing the dissertation. If applicable, how will you balance teaching obligations, dissertation writing, and preparation of job application packages? Please include a timeline for completion of the dissertation including the defense. Keeping in mind that the Graduate School will not provide stipend funding beyond the 6th year, your proposed timeline should be as honest and realistic as possible. (500 words or less)

Planned date of the dissertation defense:

May 2015

My plans for the following year are to complete two ongoing experiments (this spring), run another experiment (this summer at Brown), and prepare the job search and dissertation materials. A timeline for this work is below.

I have experience balancing research activities and teaching duties at Brown, first as a TA for CSCI 2370 in Fall 2012, and more immediately this semester, as I am the instructor of CSCI 0931. I will prepare job materials at the end of this semester and get feedback from my peers and mentors as I revise these materials before the job application season.

Spring 2014:
- Continue ongoing research in crowd-powered eye-tracking for visualization, and on an insight-based evaluation for visual analytics.
- Submit two conference submissions for IEEE VIS 2014.
- Complete my duties as instructor of CSCI 0931.
- Draft job application materials by the end of May: teaching statement (following CSCI 0931) and research statement.

Summer 2014:

- Run experiment reproducing visual analytics evaluation results using the crowd.
- Integrate software for crowdsourcing visualization evaluation tasks with version control system.
- Prepare submission for CHI 2015 on framework for crowdsourcing evaluation feedback during the development cycle. (Chapters 5 and 6)
- Draft Chapters 2 and 3.

Fall 2014:
- Submit to CHI 2015 conference.
- Teaching Assistant in Computer Science department (e.g., CSCI 2370).
- Travel for conference presentation.
- Draft chapters about crowd-powered eye-tracking (Chapter 4) and visual analytics (Chapter 5). *
- Complete job application materials and send out to openings. *

Winter 2014/15:
- Draft framework chapter (Chapter 6) and intro and conclusions (Chapters 1, 7). *
- Send out more job materials.

Spring 2015:
- Travel for job talks and conference presentation.
- Final revisions of dissertation completed and sent to committee for review. *
- Finish preparing thesis defense presentation. *
- Thesis defense.

* indicates that progress toward this task can be completed in parallel with travel obligations.

	Money requested from the Graduate School	Money provided by other sources	Comment (explain 'other sources')
Summer Only ≈ $7,667 (Up to 1/3 of AY stipend)	$7,667		
Fall Term Stipend ≈ $11,500	$11,500		
Fall Term Tuition ≈ $23,204	$23,204		
Fall Term Health Fee ≈ $356	$356		
Fall Term Health Insurance ≈ $2,986	$2,986		
Spring Term Stipend ≈ $11,500	$11,500		
Spring Term Tuition ≈	$23,204		

$23,204			
Spring Term Health Fee ≈ $356	$356		
TOTAL	**$80,773**		

Are there any other things that the review committee should know about? (Please explain briefly)

By typing my full name below, I acknowledge that I have the primary responsibility for the successful completion of my degree. I will seek guidance from my advisor, dissertation committee, DGS and others to complete my dissertation along the time line as described above. I understand that additional stipend funding beyond the amounts requested will not be available through the Graduate School.

Steven Richard Gomez